



doubt in the mind of any one subsequently comparing records. This thing is desirable for the determination of questions arising in the settlement of freight claims, and I should think it might be useful for other departments.

S. D. WEBSTER.

A Suggestion for the Improvement of the Locomotive.

New York, July 11, 1898.

To the Editor of the Railroad Gazette:

The letter of Mr. Acworth (Railroad Gazette, July 8) is certainly a candid statement of facts, coming from an Englishman, but the most interesting question does not apply to England alone, but is rapidly becoming, if it has not already got to be, a very serious problem for railroad men here in America. This is the question of greater capacity of locomotive, both as regards load and speed, within the limitations of clearance and of allowable weight. Many recent heavy locomotives constructed in this country have reached the limit of what can be done as to height, width and weight, and all well informed locomotive engineers acknowledge that nothing more can be accomplished on the present lines of construction, and that a radical departure must soon take place in locomotive design and construction.

Now that the problem is presented of getting the utmost out of the present clearance, let us see what can be done without overloading either the structures or track, both as to the question of greater capacity for speed and ability to pull heavier loads and of doing it with the least coal, as well as reducing the cost of repairs, both of the locomotives and of the track and bridges over which they have to operate. Let us assume an extreme demand for power and speed, and assume that it is required that a train of twelve 40-ton cars is to be hauled at a speed between stations of 60 miles an hour, and that stops are to be made every 20 miles and that the road is full of short grades of 20 to 35 ft. for three and four miles. To make an average of 60 miles an hour between stations, including time lost in starting and stopping and for the grades, we must assume that resistance will be 25 pounds per ton; not on the levels after speed is attained, but for starting and while ascending these small grades. Twelve 40-ton cars will weigh 480 tons, while the locomotive and tender will weigh 150 tons, making 630 net tons, which, moving at 5,280 ft. per minute, we have $630 \times 25 \div 5,280$ divided by 33,000, giving 2,520 H. P. to be constantly developed on a locomotive.

Assuming that with proper valve-gear and by the use of very high pressure and compounding 20 lbs. of water can be made to give one H. P. under these conditions, we must be able to evaporate 50,480 lbs. of water per hour. It is fair to assume that, under the conditions, the boiler will evaporate 8 lbs. of water per pound of coal, which would give us 6,310 lbs. of coal to be burned per hour. On a grate of 70 sq. ft., this is at the moderate rate of 90 lbs. per sq. ft. of grate per hour, while some engines in this country are burning as high as 225 lbs. per sq. ft. but are not getting 8 lbs. of evaporation. The boiler to do this has to be 60 in. smallest diameter, and has a direct heating surface of 1,040 sq. ft., with 2,000 sq. ft. of tube heating surface and 70 sq. ft. of grate, and is a safe boiler at 250 lbs., there being no stay-bolts for flat surfaces. The engine has 4-coupled 6 ft. 6 in. driving wheels with 4-wheel truck forward and trailing-wheel, while the driving wheels carry 100,000, the forward truck 35,000, and trailing wheels 25,000, making total weight of engine 160,000 on a wheel base of 29 ft., 8 ft. of which is rigid.

The tender is fitted with heaters which have a heating surface of 1,600 sq. ft., by which the feed water is heated with a portion of the exhaust to 230° before entering the boiler—this temperature being due to 6.3 lbs. back-pressure due to exhaust nozzle. This also deposits a large portion of the solids in the water in the heaters, and prevents fouling of the boiler; a portion of the steam is condensed (about 20 per cent.), and is returned to the tender. This 1,600 sq. ft. of heating surface, added to that of the boiler, gives the engine 4,640 sq. ft. heating surface on an engine and tender that will turn on a 54-ft. turntable and will clear on almost every road in America.

Recent developments in regard to heating feed water in marine practice have demonstrated that a square foot of heating surface in a heater is quite as valuable as a square foot of heating surface in a boiler, and it is getting to be common to heat by live steam when condensing engines are used, where exhaust cannot be had; and this has shown considerable economy—the latest conclusion being that the boiler should only be called upon to give back the latent heat of evaporation, as the surface of the heater is much more efficient as heating surface than the surface of the boiler with the gases of combustion, which are poor conductors of heat.

The sensible temperature of steam at 66 lbs. pressure, is 230.6, while the total heat is 1,183.7; while at 205 lbs. pressure the sensible heat is 397.5, and the total heat is 1,234.6—the latent heat of evaporation at 205 being 857.1.

The greater efficiency of marine boilers when fed with water previously heated by live steam made in the same boilers, is probably due to the greater

efficiency of heating surfaces that are never chilled to the point of condensing the gases and the depositing of soot on the surfaces. While the theoretical gain due to heating feed water from 60 to 200, as given by D. K. Clark, is 13.2 when fed with pump driven by the engine, the actual gain on a locomotive is much larger, owing to the fact that the demand on the boiler is much reduced, and it comes so much nearer its economical rate of evaporation—the same as is noticed in the increased evaporation, when a good compound is used, as against the simple engine. In many instances the saving has been as large, due to increased efficiency of boiler as to decreased amount of water used by the compound, but the increased efficiency of the boiler was doubly due to the less demand on it and its reduced rate of combustion, or less amount of coal to be burned per square foot per hour.

The experience of the writer with repeated trials of surface heaters on locomotives has demonstrated that they can be depended upon to save about 20 per cent. of the coal, over the present practice of feeding with injectors.

GEO. S. STRONG.

The Unwinding Test for Air Brake Hose.

Chicago, Ju y 12, 1898.

To the Editor of the Railroad Gazette:

I made some tests on some new air brake hose shortly since in connection with a Master Car Builder, on the lines recommended by some roads and manufacturers, and having years since had some experience in practical rubber manufacturing, I would like to explain the results of the tests, as railroad men are not as a class "up" on rubber.

The test referred to was the unwinding of the fabric or "friction," or, in plain words, the canvas duck of the hose, by a weight of 25 lbs. at a given rate, it being assumed that the slower this unwinding occurred the better the quality of the hose. There is a common practice among many rubber makers of putting out cheap sheet packing, hose, etc., which is extremely soft and flexible—when new—and which will cause those unacquainted with rubber to pronounce it a superior article, when, in fact, it is very short lived. It is the result of under curing, that is not vulcanized to the proper amount for the best and longest service, as, if it were fully vulcanized, it would not be as pliable, but it would last much longer. This undercured rubber only retains its softness for about six months, when it becomes very hard and brittle—hence air hose makers often require that their hose shall be tested within sixty days of their manufacture.

Now, as to the test I spoke of. The piece tested was cut from a new hose, just received in the storehouse, and it made the test nicely. But on testing similarly a hose of the same manufacture, taken from a car, which hose had been in use some six months, it failed absolutely in this unwinding test of the "friction." It was this fact which the M. C. B. wanted explained, and he now understands why air hose which make the test when new soon become very stiff and cracks badly. If the hose tested is fully cured, it will not make the test once in a dozen trials, even when the hose are new, but they will not become hard nor stiff, nor crack, and will remain unchanged for three or four years. The unwinding test demonstrates clearly that there are tricks in all trades, and that the railroad official as an average, having no experience in rubber making, is fooled by one of the oldest of tricks known to rubber makers—uncured rubber.

Besides all this, there are certain makes of hose—and air hose, too, I think—which have practically no “friction” or “cloth” (canvas duck), but in lieu of same use a seamless network—like linen hose, but more open, and of heavier twine, which makes a splendid hose. This hose cannot be tested by the absurd unwinding test, which, when it is filled, indicates uncured rubber as surely as the compass indicates the north.

As suggested by the M. C. B. referred to, the safe and sure test is a service test—guaranteed for two or three years—leaving the manufacturer to make his horse as he sees fit—so long as they give the required life or service, and it is service the road wants and pays for, and by so doing the rubber makers' superior knowledge and enterprise are taken full advantage of, and can only result in better hose at better prices, similarly as cast iron freight car wheels have on service requirement of mileage or years reached perfection for service and cheapness. If the railroads had in place of this requirement specified the kinds of iron or mixture to be used in the wheels, or tied the manufacturer up with absurd and ignorant tests, which in no way tested the wheel as to its service, then railroads would be paying to-day from \$15 to \$18 per wheel, which would not give over two years' service, I am told. G. P. CAMPBELL.

To the Editor of the Railroad Gazette:

Mr. Campbell's communication contains a great deal of common sense. It is a fact that substitutes or inferior grades of rubber can be used for the friction between the plies of duck in rubber hose, and this friction will be very tough and strong when new, but after a few months it will lose its life and strength and become dead and worthless. Unless a

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Contributions.

Heat Tests for Car Wheels.

Canadian Pacific Railway Company,
Montreal, July 16, 1898.)

To the Editor of the Railroad Gazette:

Referring to your issue of July 15, page 514 and third column, remarks regarding heat tests of car wheels, it appears to me that the influence of silicon has been neglected in these remarks.

R. ATKINSON, Mechanical Superintendent.

Track Thrown by Heat.

Fort Wayne, Ind., July 12.

To the Editor of the Railroad Gazette:

In response to your request on page 499, issue of July 8, as to effects of heat on rails, I inclose three views of street railroad rails in this city, Fort Wayne, thrown out of line by the excessive heat prevailing



here Friday, July 8, 1898. The tracks at a street crossing were being lowered for a new grade, and almost as soon as uncovered the sun did the twisting.

HENRY M. WILLIAMS.

Marking Cars for the Claim Agents.

St. Louis, Mo., July 15, 1898.

To the Editor of the Railroad Gazette:

Allow me to suggest, for the consideration of all concerned, the desirability of having all freight cars designated, as to their sides and ends, by numbers or letters, as A, B, C, D.

Cars are turned about in transit, and what is front end, or north end on one line may, after passing the next junction, be back, or east, or west end. Exceptions to condition or to security, recorded by inspectors, at once take on an element of uncertainty. An east end "bulged" may become a north, or any other point of the compass end; there is a possibility that the inspector's exception was not made with reference to the same end in one case as in another. This uncertainty is avoided if all notations are **made**, definitely, with reference to a marked part. Seal on A side, or four boards of siding, A side, or wheel chipped, A side, B end, and so on, would leave no

person is an expert it would not be difficult to use inferior material of this nature, and the chances are that it would not be discovered until time had revealed the poor quality of the material. A good quality of friction gum when fully vulcanized, and when new, will not withstand the unwinding test so successfully as a much cheaper, but inferior article, but the former will outlast the latter many times over, and hose so made will therefore be much more economical and serviceable in the long run.

The specifications for air brake hose which were presented at the recent conventions at Saratoga are all very well from a theoretical standpoint, but they contain many features of which we, as practical rubber manufacturers, do not approve. So far as our experience goes, the only satisfactory and reasonable test for rubber goods is the test of actual service. Air brake hose is not required to be unwound in practical use, and because the friction cannot be unwound by a 25-pound weight, it does not follow that such a friction is permanently good, neither does it follow if a 2-inch section taken from the inside of the tube will stretch 400 per cent. that such a hose is likely to be as good at the end of two or three years as one which has a less elastic tube. Absolutely pure rubber, while, of course, being the most elastic, will become hard and oxidize with age much more rapidly than rubber which has been skillfully compounded for use in connection with a special purpose.

Much has been said in regard to a tubular or seamless braided air brake hose, of two or more plies. While this is perhaps a somewhat new feature as regards air brake hose, the idea is a very old one. The process of making hose of this construction is slower and more expensive than for making the ordinary regular rubber hose with three or four plies in the regular way. While braided hose may be well adapted for use in connection with the air brake, we do not think that such hose can be made and sold at a sufficiently low price to make its adoption general. Good hose can be made in the regular way, if the railroad companies will pay a reasonable price for it. The trouble heretofore has been that the purchasing agents have been so anxious to get the price down, most manufacturers have been compelled to reduce the quality of their product accordingly. We think if the companies would be content to rely on the experience and integrity of rubber goods manufacturers to produce the best air brake hose that can be made at a fair and reasonable price they would have no cause whatever for complaint.

We have no hesitation in saying that the practice of giving a time guarantee on air brake hose has been one of the most unsatisfactory features, both to the railroad company and the manufacturer, that was ever introduced in connection with the business, and it is much less common now than formerly. To our air brake hose we attach a label which reads as follows:

"We guarantee our air brake hose to be made of the best materials, perfect in workmanship, and that each section when delivered and if properly tested will not burst at less than ten (10) times the average pressure required in service."

Occasionally we are asked to give a time guarantee in addition to the above, and in such cases the only guarantee that we make is that the hose is perfect in material and manufacture for a period of 24 months from date of delivery. We have known, of course, where manufacturers have guaranteed hose to last for a stated length of time in service, and the folly of this is at once apparent. There is no good and sufficient reason why the manufacturer should be held responsible for hose that is rendered unfit for service through causes for which the railroad company is solely to blame, neither is it fair nor equitable for the railroad company to get 23 months' service out of a piece of air brake hose and then throw it back on the manufacturer's hands, claiming a new section without charge, when the first piece had only failed to make its full period of service by one month. A much fairer system, and one which has been practiced by some roads, is for the railroad company to pay pro rata for the service rendered by the hose, in cases where a time guarantee is given. In such instances if a section of hose fails at the end of 12 months, through defects in material or manufacture, the manufacturer would make a rebate to the company of one-half the amount originally paid for the hose, if a time guarantee was given. MAKER.

The Proper Marking of Freight Cars.

Mr. H. H. Perkins, Freight Agent, New York Central & Hudson River Railroad, at the May meeting of the Central Railway Club, called attention to the delays to cars and the needless inconvenience caused to inspectors and other yard men by the present methods of marking freight cars. In many cases the initials are near one end and the number of the car near the opposite end, making it impossible to read the two at one glance, excepting from a considerable distance. Mr. Perkins said in part: Car numbers are most frequently taken by men standing on the ground and often the numbers are painted within two feet of the eyes. This may be all right from freight house platforms, but these very platforms enable any one on them to readily read the numbers at any height, but for one between the cars it is neck-breaking. Some roads probably consider very large figures

extremely plain and so they are half a mile away, but when a number taker is compelled to stand within eighteen inches of the car on a dark night with a lantern, how is he to distinguish the paint in the letters from that of the side of the car when each occupies about the same space.

The practice of painting the full name of the road on a car cannot be too highly commended as it enables railroad employees not well versed in geography or the names of other roads than that for which they work to identify and locate the owner's road and it might be further improved by also stenciling the more important stations of the road or that to which the owner would prefer to have cars sent when empty with words to such effect.

The number and initials required to identify any car should be considered as one and placed in such proximity that they may be read as one and included in one glance. Before freight cars are destroyed, except by accident, the numbers and initials are not only copied thousands, but perhaps millions, of times; most of the time some engine and crew or a gang of inspectors or repairers and always clerks in an office are waiting for the list. It is not half the time a number taker is so located that he can see both ends of a car side at one glance and when required to look twice there is a delay materially increased by additional movements of person or lantern. To obviate this the number and initial should not be much above the head, say not above half the height of the body of the car from the bottom of the sills and the figures should be of such size as to be readily taken in by the eye at a few inches, feet or rods. Letters not exceeding eight or ten inches square each will answer, and the initials should be very close to the numbers, perhaps just above or below is preferable. By initial, reference is made to either those of the line of road by which the car is reported to the Car Accountant, by which its mileage is kept, or by which freight and railroad yard men distinguish it from all others.

The Nilgiri Railroad.

The Nilgiri Railroad in India is about to be opened for public service. References have been made in the public press to the difficulties met in building this line, and some facts may not be uninteresting. The line starts from the Mettappally station on the Madras Railroad and for $4\frac{1}{2}$ miles the alignment is fairly straight until the foot of the hills at Kulhar station is reached. Up to this point the curves are easy and the steepest grade is but 1 in 40. From Kulhar to Coonoor the road climbs a grade of 1 in 12 $\frac{1}{2}$. There are nine tunnels on this line, of which the longest is 322 ft. They were all excavated without much difficulty, but considerable care had to be exercised both in leveling and laying the alignment to insure the meeting of the headings from the two ends. The permanent way is laid with flat-footed rails, 50 lbs. per yd., and laid on wooden sleepers weighing 70 lbs. per cu. ft. No special precautions seem to have been taken to anchor the permanent way in order to prevent the rails from creeping down hill, except at the joint sleepers, where the usual device of dropping a rivet-headed bolt through the foot of the rail into the sleeper has been employed. The rack portion of the permanent way consists of cast iron brackets securely bolted to the sleepers by two $\frac{3}{4}$ in. fang bolts, and to the brackets are bolted a double line of rack bars 10 ft. 2 $\frac{1}{2}$ in. long stamped out of steel 4.3x $\frac{3}{4}$ in. in section. Great care has necessarily been taken in laying the permanent way. The brackets were first fitted on to the sleepers at the issuing depot and tested with square and plumb to see that they were truly bedded, and the sleepers were then passed for adzing before they were sent forward to rack-head. Arriving there they were laid on a few inches of ballast, and the rack bars were then bolted to them. This was a most difficult undertaking, because the bars were all bored and ready, and the slightest error made in the space which was left for expansion, or in the overlap resulting from working round sharp curves, threw out the exact adjustment which was required before the rack bolts could be inserted. The position of every rack bar had to be personally tested by an engineer before progress could be reported, so that the progress seldom exceeded 300 ft. a day. At the two ends of each section of rack a short piece on springs is laid to enable the pinions of the engine to pass easily on to and grip the rack. The total weight of the permanent way, including rails, sleepers, fastenings and rack, works out to about 260 lbs. per yd., which, being nearly the same as the weight per yard of a broad-gauge line laid with 75-lb. rails on trough sleepers, must be considered very heavy for a metre gauge railway.

The bridgework on the line is heavier than might be expected, there being 35 spans of 60 ft. and over and 44 spans of shorter lengths. The Burliar bridge, five spans of 60 ft., between Kulhar and Adderley, is the highest on the line, being 120 ft. above the level of the torrent below, and several range from 50 to 70 feet in height. Most of the bridges are on curves of 328 ft. radius and grades of 1 in 12 $\frac{1}{2}$, so that it has been necessary to build the lower end of the girders of each span into the masonry of the pier or abutment on which it is resting, besides bolting it down securely by Lewis bolts sunk into the bedstones. The class of masonry is coarse rubble; and, considering the difficulties in the way of transport and the unusual height to which the masonry was built, it was cheaply done. The iron work of all spans up to 60 ft. is of the plate girder type, of which the cross section approaches nearer to that of broad than of narrow gauge girders, owing to the very heavy type of locomotive which they are built to carry. Only the best and hardest kinds of stone have been used for ballast, the rate for which has varied according to the locality from $\frac{1}{2}$ to $\frac{3}{4}$ per 100 cu. ft. For the whole length

of the hill section ballast walls 1 ft. above formation have been built parallel to the center line and on both sides of the track to prevent the ballast from spreading and to save it from being washed away by the streams which tear down the side drains during every shower of rain. The quantity of ballast used per foot run is 13 $\frac{1}{2}$ cu. ft., and it has all been broken carefully to pass through a 1 $\frac{1}{2}$ -in. ring.

Referring to the locomotives and other features of the road than those already mentioned, Mr. B. P. Wall, M.I.C.E., to whom we are also indebted for the above information, says: "The locomotives, which, by the way, have been christened 'Panther,' 'Leopard,' 'Tiger' and 'Lion' respectively, are beautifully finished, and experience with them has proved that they are quite capable of taking their full loads up a grade of 1 in 40, but an equally good result has not been obtained up to the present on the rack portion of the line. The steam pressure drops very rapidly when the rack cylinders are put in motion. This result is probably due to want of experience in working new class of engines, and improvement may safely be looked for when they are understood better. The rolling stock on the line has all been built complete, including all woodwork and upholstery, in England, at a cost of £920, £800 and £570 for each first, second and third class vehicle. The carriages are run on two four-wheeled bogies and are fitted with vacuum and hand brake on all wheels. They weigh 11 to 12 tons each and have accommodation for as many passengers as a broad-gauge carriage. They are fitted with a hand brake on all the wheels of their two bogies, and besides they have a special rack brake. It will be noticed from the description of the locomotives and rolling stock that very special precautions have been taken to fit them with sufficient brake power to insure safe working, and it would appear that anything further in the way of measures to control runaway trains is unnecessary; but the effects of such an occurrence are likely to be so disastrous that it would be advisable to put in a catch-siding at the lower end of every station. The cost of catch-sidings about 300 ft. long would be very small indeed if the alignment were run up the side of a steep spur and laid with any old material available on the line and the security to be obtained from them would be greater than that of all the brakes on the train. It is too late to discuss the question of gage in connection with the Nilgiri Railroad, but there is no doubt that a line on a much narrower gage than one metre would have answered all the purposes for which a railway was demanded. It would have stood a better chance of earning a dividend and it would have taken less than half the time that the present undertaking has taken to build. The dream of the future is, of course, to carry the line over the ghats down to the Port of Calcutta, on the west coast of India, and also to make a connection with the metre-gage systems on the east, so as to have unbroken communication on the same gage across the Peninsula; but since the rolling stock on the railroads in the plains will never be worked up the ghat sections, and transshipment will have to take place at the foot of the hills, the disadvantages of a break of gage are not as great as might be supposed. Further, any extension of the metre-gage lines will place them in direct competition with the Madras Railway, and since the latter has never found sufficient traffic to make it pay its way it is hardly likely that anything handsome will be earned if two railroads compete for the traffic that exists."

American Society of Railroad Superintendents.

The 28th meeting of this Society was held at Alexandria Bay, N. Y., July 13. The attendance was very small, many members being kept away by the pressure of work incident to heavy traffic. President Price was unavoidably detained at home, and the meeting was presided over by the Second Vice-President, Mr. George R. Brown, of the Fall Brook Railway.

The Executive Committee reported that the Treasurer had on hand \$1,346. Minor amendments to the constitution were recommended. The report of Secretary C. A. Hammond showed the membership to be 224. The receipts for advertising in the proceedings during the past year amounted to \$556. Secretary Hammond renewed his former recommendation that the Society be reorganized, and his views were concurred in by the Executive Committee; the Society must grow or die; the Superintendents' Society ought to do as good work as the Master Car Builders', the Car Accountants' and others have done in their respective fields. In line with the recommendations of the Executive Committee and of the Secretary, Mr. E. G. Russell (N. Y. C. & H. R.) made a strong argument in favor of recasting the committees, so that the Society shall devote itself more exclusively to its own field, that of "conducting transportation." The work of the Civil Engineer and of the Superintendent of Motive Power has no place in the activities of this Society. It was declared by Mr. Russell, and by other speakers, that the Society could not succeed unless a competent man were hired to give his whole time to the promotion of its interests and to keeping members acquainted with the demands of the Society and their duties as members. Mr. Ketcham (West Shore) said that members should devote themselves more seriously to committee work when appointed; a member should first get the full approval of his superior and then devote the necessary time to making the work of committees useful. After desultory discussion by a number of members the Secretary prepared the following resolution, which was adopted.

That the recommendations contained in the reports of the executive committee and secretary be referred to the executive committee with instructions to give them their earnest and careful consideration and to bring in at the next meeting a draft of constitution and by-laws embodying a comprehensive plan of reorganization of the society, with especial reference to transportation practice, and that the committee correspond with the members of the so-

ciety, and before making up their final report submit their general scheme by printed circular to each railroad company represented in the society, for criticism and suggestion of the road through its transportation officers, and that the final report of the executive committee be printed, ready for distribution to each member of the society, at least two weeks before the next regular meeting.

Mr. Heindell, Chairman of the Committee on Machinery, presented a report on the importance of co-operation between the train service and the machinery departments. On many railroads the Master Mechanic and the Superintendent are still independent of each other, producing much friction in the handling of engines, with consequent loss of time and impairment of discipline. The Master Mechanic should be subordinate to the Superintendent; then the latter would have all the important operations of his department thoroughly in hand, with a great improvement in efficiency. Being responsible for both departments he will see that the interests of one are not advanced at the expense of the other.

The afternoon session was presided over by Mr. E. G. Russell (N. Y. C. & H. R.). The first business was a report presented by Mr. Smith (L. S. & M. S.) of the Committee on Transportation. Mr. Smith briefly described the different departments of work within the control of the Superintendent and outlined the characteristics of a good man for such a place. Transportation is now a science and a superintendent must have a thorough training. The only specific recommendations for discussion made in this report were one as to the extent to which "19" orders can be used by train dispatchers, one concerning the reduction of delays in division terminal yards and one concerning the best methods of carding cars.

In the discussion which followed, it appeared that on the Erie road many orders which do not restrict the rights of trains are given on Form 19. On double track, where a passenger train is run late, a duplicate order is given which goes to the passenger train on Form 31 and to the inferior train on Form 19. The dispatcher writes the order on Form 31, but to the operator who takes the order for inferior trains he says "19." The same practice is employed on single-track lines, though never for movements of trains running toward each other. Where a 19 order is to be delivered to a heavy freight train, the operator does not stop the train, but gives the engineman a hand signal to slacken sufficiently to take the paper from the operator's hand. If an engineman should fail to catch the order held up by the operator he would have to come to a stop, because his time-table rights would not permit him to go farther; or, in case the order was offered at A, while the rights already possessed by the train would allow it to go to B, no danger would follow from failure to deliver the order. Mr. J. F. Maguire, Superintendent of the Susquehanna Division of the Erie, stated that by the free use of 19 orders in this way the movement of heavy freights had been much facilitated. By sending 19 orders sufficiently far in advance it is possible to avoid many stops which would be unavoidable if Form 31 were used; and such stops would often cause a loss of half an hour for a heavy freight train. As on most or all of the Erie lines the block system is used, the officers of that road are favorably inclined toward the use of 19 orders for making meeting points, both for first-class and second-class trains. Form 19 is used for meeting orders for first-class (passenger) trains on some single-track divisions of the Pennsylvania road; and it is used on the Fall Brook Railway, mostly for freight trains. Mr. Brown says that to indicate to a train that a 19 order is to be delivered the operator uses the train order signal until the train is brought almost to a stop. Each conductor must see that the train order signal stands at danger behind his train before he gets out of sight. When an operator is obliged to be absent, as at dinner, and leaves the train order signal at all-clear, he must climb the semaphore pole and place near the arm a white flag, or at night a white light. This practice has been in vogue for seven years.

Form 19 has been used for three years on the Old Colony System of the New York, New Haven & Hartford, though never to restrict the rights of trains. Mr. Gest (P. R. R.) emphasized the importance of adhering to the rule to have one telegraph office between the point where an order is given and the point where it is executed; if this rule is carried out and the delivering operator reports to the dispatcher when he has delivered the order, the principal liability to danger is removed.

Some discussion followed as to whether the engine number should be given in a train order. Where sections of a train are numerous the engine number is the easiest identification for sections. On the Lake Shore & Michigan Southern, on the Baltimore & Ohio Southwestern and on the Western New York & Pennsylvania the Parsons transparent numbers and letters are used for showing train numbers in the supola of cabooses. The criticism was offered that sometimes a conductor whose train is changed from third section to second will forget to change this number, but on the Lake Shore, where the Parsons device has been long in use, there has been no trouble of this kind. The Erie now has a large number of cabooses equipped with this device. On the Western New York & Pennsylvania conductors have to be careful to take down all numbers from the cupola when the train reaches the end of its trip.

At this stage of the proceedings the meeting listened to an address of welcome from Colonel Shaw, who was to have been present in the morning, but was detained. After this the miscellaneous topics named in the programme were taken up. From an informal discussion on handling supplies it appears that many members are making progress in the economical use of lamps, oil, waste, brooms and other things used at small stations and on freight trains. Several members are keeping their records more and more carefully so as to find out the cost of supplies by the train mile. Some records of this kind are deceptive by reason of not containing all items that ought to be included. On the West Shore a lantern or flag is given to any trainman without requisition, so that there shall be no excuse for not having signals. For other things a regular requisition must be made. In one month recently 43 crews, averaging 3.75 miles each, used supplies amounting to an average of \$3.29 each. Some trains showed an expense of as low as \$1.56. This includes everything except car oil. At 75 small stations the expense for stores, not including stationery, averaged in a certain month only 48 cents. This did not include switch lamp oil.

Under the head of supplies Mr. Russell mentioned a chain with two hooks which is used and much liked on his division. There is a large link in the center which can be attached to a drawbar. These chains are so well liked by the trainmen that they take care to preserve them and not a new one had had to be ordered for three years. Mr. Flanders (Cincinnati Northern) had found a chain with a link about one foot back from the hook very convenient.

Mr. Russell charges switch keys to the conductor for all of the men on a train. He has required reports of the number of hot boxes attended to, in conjunction with a strict account of oil used, and the conductors now take great pains to avoid setting off cars where there is no inspector. It is 18 months since he has had to send out a repairman to attend to a journal. Mr. Ketcham (West Shore) has also greatly reduced the number of cases in which men have to be sent out to attend to hot boxes. He called attention to the fact that sometimes the trouble with supplies is that men do not call for enough, as for instance in the case of torpedoes. If a conductor does not call for a reasonable number he should be questioned as to why more are not used.

The use of air brakes on freight trains was next discussed. The yard of the West Shore at East Buffalo now has air pipes to a large number of tracks, so that brakes can be inspected before trains are made up. There was desultory discussion, participated in by several members, on the prevention of damage from trains breaking in two. The three points made were, thorough training of all the men on the train in the use of the air brake, training in the use of the hand brakes at the proper time (in trains partially equipped with air) and the elimination of old and defective couplers. Some types of M. C. B. couplers have had to be fitted with new pins before they were satisfactorily safe.

The proper discipline of enginemen and station agents in keeping switches properly lighted at night was the subject of a brief discussion. Enginemen will not take the trouble to report all missing lights unless they are regularly watched. On the Lake Shore & Michigan Southern enginemen have a card on which are printed circles representing each switch light at each station. The engineman can report a defective light by simply making a cross on the proper circle. One of these cards is carried over the road every night, generally by a slow train.

The subject of wrecking cars being under discussion, Mr. Russell (R. W. & O. Div. N. Y. C. & H. R.) said that on one division of his road, consisting of 700 miles, the wrecking cars had not been moved in seven months.

One of the topics on the programme was wagon delivery of freight by railroads to stores, etc. Nothing was brought out except that, in the opinion of one member, who had had to deliver freight at one station, it was the biggest nuisance he ever saw.

In the election of officers Mr. E. G. Russell was chosen First Vice-President and Mr. M. J. C. Wrenne, Second Vice-President.

Train Accidents in the United States in June.

COLLISIONS.

Rear.

6th, on Pennsylvania road, near Lancaster, Pa., a freight train broke in two and the rear portion afterward ran into the forward one, wrecking two cars. A tramp was injured.

6th, on Philadelphia & Reading, at Harrisburg, Pa., a milk train ran over a misplaced switch and into a freight train standing on the side track. Two trainmen were injured.

9th, 2 a. m., on Chicago, Burlington & Quincy, near Aurora, Ill., a freight train broke in two and the rear portion ran back into the head of a following freight, wrecking three cars, which took fire and were destroyed. The engineman and six drovers were injured.

10th, on Philadelphia & Reading, at Trevoise, Pa., a freight train standing at the station was run into the rear by a following freight, wrecking the caboose and 5 cars and badly damaging an engine. Three trainmen were injured.

11th, on Western Maryland, at Russell, Pa., a freight train broke in two and the rear portion afterward ran into the forward one; 2 trainmen injured.

11th, on Louisville & Nashville, at Greenville, Ala., a freight train standing at a water tank was run into at the rear by a following freight; 1 brakeman was injured.

13th, on Pennsylvania road, near Granville, Pa., a freight train ran into the rear of a preceding freight, wrecking 8 cars, most of which were destroyed by fire. One engineman was injured.

26th, on Central of New Jersey, near Dunellen, N. J., a freight train of the Philadelphia & Reading, which had been suddenly stopped by the automatic application of the air brakes, was run into at the rear by a freight train of the Baltimore & Ohio; engine, caboose and 2 cars badly damaged; engineman injured.

26th, on Kansas City, Memphis & Birmingham, at Tupelo, Miss., a train carrying soldiers ran into the rear of a preceding train of soldiers, which had stopped to take water, wrecking the engine and two cars. Four soldiers and a sleeping-car porter were killed and 15 soldiers and the engineman were injured. One of the injured was the colonel in command. One of the injured subsequently died. The car most seriously damaged was in the center of the foremost train. This car was crushed and in it the fatalities occurred. A sleeping car in the wreck took fire, but the flames were soon extinguished. The newspaper reports state that this was the same train which had its engine derailed at St. Joseph, Mo., two days before, when the engineman and fireman were killed; and also that one of the soldiers was killed in the tunnel at St. Louis by falling off a car in consequence of having been suffocated by gas.

30th, on Baltimore & Ohio, near Prout's Station, O., a freight train descending a grade broke in two and the rear portion afterward ran into the forward one, wrecking 2 cars. A tramp was badly injured.

And 12 others, on 8 roads, involving 2 passenger and 18 freight and other trains.

Butting.

1st, on Chicago & Northwestern, at Norway, Ia., a passenger train ran over a misplaced switch and into the head of a freight train standing on the side track, making a bad wreck. Both enginemen and both firemen were injured, one fatally.

3d, 4 a. m., on Baltimore & Ohio, near Davisville, W. Va., butting collision between a freight train and a gravel train, wrecking both engines and 20 cars. Three trainmen were injured.

9th, on Pittsburgh, Cincinnati, Chicago & St. Louis, at Dennison, O., a passenger train ran over a misplaced switch and into a freight engine standing on the side track, damaging both engines. The passenger fireman jumped off and was injured.

12th, on Baltimore & Ohio, near Zanesville, O., butting collision of freight trains, wrecking both engines and 20 cars. One engineman was killed and one brakeman was injured. It is said that the eastbound freight failed to wait for the westbound, according to the rule, the engineman mistaking a switching engine for the train he was to meet.

13th, on Lehigh Valley, near Kennedy, N. J., butting collision of freight trains, wrecking both engines and 15 cars. One conductor was injured. The eastbound train was running on the westbound track, in consequence of an obstruction on the other track, and it appears that conflicting telegraphic orders had been given.

14th, on Richmond, Fredericksburg & Potomac, near Richmond, Va., butting collision between a work train and a freight; 1 employee was killed and 4 injured.

16th, 2 a. m., on Atchison, Topeka & Santa Fe, at Conroy, Col., butting collision between passenger trains 5 and 6, badly damaging both engines and two cars. Four passengers were injured.

22d, on Southern Pacific, at Thisbe, Nev., butting collision between a freight train and an empty engine, badly damaging both engines. One engineman was injured. It is said that a dispatcher gave conflicting orders.

And 3 others on 3 roads, involving 6 freight and other trains.

Crossing and Miscellaneous.

3d, on Boston & Albany, at South Framingham, Mass., a freight train being switched became uncontrollable and there was a slight collision. A tramp was killed.

11th, on Baltimore & Ohio, at Benwood, W. Va., collision between a passenger train and a freight; one trainman injured.

18th, on Pittsburgh, Ft. Wayne & Chicago, at Remington, Pa., a freight train entering a side track was run into by another freight approaching on the main track, wrecking 15 cars. Two trainmen were injured.

22d, 7 p. m., at Niagara Falls, N. Y., a freight engine of the Erie road running "wild," without attendant, ran off the track at a switch and was overturned. The engine was in a collision with a Grand Trunk freight train on the Canada side of the river and in the collision the engineman was crushed between the cab and the tender and was killed. The fireman jumped off and, the throttle being jarred open, the engine ran unattended across the Grand Trunk bridge and through the yard on the east side of the river. It was purposely derailed to avoid further damage.

27th, on St. Louis, Iron Mountain & Southern, at Middlebrook, Mo., a freight train entering a side track was run into by a passenger train and three freight cars were wrecked. A mail clerk was injured.

28th, on Baltimore & Ohio, near Mark Center, O., collision of freight trains injuring 1 employee.

And 13 others on 12 roads, involving 2 passenger and 23 freight and other trains.

DERAILMENTS.

Defects of Roadway.

2d, on Union Pacific, Denver & Gulf, near Sedgwick, Col., a passenger train was derailed by spreading of rails and nearly all the cars were badly damaged. Ten passengers were injured.

4th, on South Carolina & Georgia, near Chalker, Ga., a freight train broke through a trestle which had been weakened by fire and the engine and first three cars fell through. The wreck took fire and most of it was soon burned up. Four trainmen were injured.

9th, on West Shore, near Clyde, N. Y., an engine and caboose running at high speed were derailed at a point where the roadbed had been softened by rain, and both were ditched. The fireman was killed and the engineman and 4 other trainmen injured.

11th, on Chicago, Rock Island & Pacific, near Colby, Kan., passenger train No. 5 was derailed at a point

where the roadbed had been softened by a severe rainstorm, and several passengers were injured.

13th, on Columbus, Hocking Valley & Toledo, near Owen, O., a freight train was derailed by the breaking of a switch rod, and 20 loaded cars were ditched. A brakeman was killed.

Defects of Equipment.

15th, on Nevada County Narrow Gauge, near Grass Valley, Cal., a passenger train was derailed by a brake shoe falling on the track, and two cars were overturned. Six passengers were injured.

19th, 1 p. m., on Norfolk & Western, near Shawsville, Va., a passenger train was derailed by the breaking of a flange on the front truck of the locomotive, and the engine was overturned. The baggage car was wrecked. The engineer and fireman and one mail clerk were killed and 2 other trainmen and 6 passengers were injured.

21st, on Pennsylvania Railroad, at Downingtown, Pa., a car in a freight train was derailed by a drawbar which was pulled out and fell upon the track; 2 trainmen injured.

21st, on Cleveland, Cincinnati, Chicago and St. Louis, near Tremont, Ill., a freight train was derailed by a broken axle; the fireman jumped off and was injured.

21st, on Pennsylvania road, at Downingtown, Pa., the caboose of a freight train was derailed by a drawbar which was pulled out and fell upon the track, and the conductor and one brakeman were injured.

21st, 9:20 p. m., on New York, New Haven & Hartford, at Naugatuck Junction, Conn., a car in a freight train was derailed by a drawbar which was pulled out and fell upon the track and with five other cars fell against the trusses of the bridge over the Naugatuck River. The track was cleared within a few hours, but the bridge was found to have been weakened, so that trains could not be safely sent across, and the road was blocked 41 hours. This accident was reported in the Railroad Gazette of July 8.

And 14 others on 13 roads, involving 14 freight and other trains.

Negligence in Operating.

3d, on Atchison, Topeka & Santa Fe, at Alma, Kan., several freight cars were derailed in making a tying switch, and a brakeman was injured.

16th, on Chicago, Milwaukee & St. Paul, near Racine Junction, Wis., a passenger train was derailed by a misplaced switch and the engine and one passenger car were overturned. The fireman was injured. It is said that the signalman in the tower carelessly threw the switch in the face of the train. He says that a switching engine had just passed; he thought it was the passenger train, and, being busy writing, "moved the switch without looking."

And 3 others, involving 3 freight trains.

Unforeseen Obstructions.

7th, 3 a. m., on Baltimore & Ohio, near Parkersburg, W. Va., a passenger train was derailed by rocks which had been piled on the track by boys, and the engine ran against the portal of a tunnel. The engineer was killed and the fireman and 2 tramps were injured.

10th, on Columbus, Sandusky & Hocking, near Thornport, O., the engine and first three cars of a passenger train were derailed at a washout, and the engine and tender were overturned. The engineer, one brakeman and 3 passengers were injured.

10th, on Great Northern, near Williston, N. D., a work train was derailed by a landslide and a steam shovel was badly wrecked. Two employees were killed and one injured.

And 3 others, involving 3 freight trains.

UNEXPLAINED.

2d, on Southern Pacific, near Gibson, Cal., a freight train was derailed, 8 cars being ditched. A brakeman was injured.

3d, 1 a. m., on Missouri Pacific, at Osage City, Mo., a car in a freight train was derailed at the entrance to a bridge and with several others fell against the truss and broke down the draw span, five cars falling into the river.

5th, on Pennsylvania road, at Camden, N. J., a switching engine was derailed and overturned and the engineer was injured.

9th, on Chicago & Northwestern, near Baraboo, Wis., a freight train was derailed, and the engineer was fatally injured.

12th, on Southern Pacific, near Glendale, Ore., a freight train was derailed and a brakeman riding on the front end of the engine jumped off and was killed. Two other trainmen were injured.

19th, 4 p. m., on Central of New Jersey, at Glen Onoko, Pa., a passenger train was derailed and the locomotive and baggage car, running into the ditch, were wrecked on one side by rubbing against the retaining wall for the Lehigh Valley track, which is parallel at the place of the accident, and several yards higher than the Central track. The smoking car ran off the track at the left and fell into the Lehigh River, about 10 ft. below, in which, however, the water was quite shallow. Two trainmen were killed and five passengers injured. The roof of the baggage car was thrown upon the Lehigh Valley track and damaged the locomotive of an east bound passenger train on that road, which was passing at the time.

24th, at the Union Station, St. Joseph, Mo., a switching engine of the Hannibal & St. Joseph, drawing a train of soldiers from the Atchison to the Burlington yards, was derailed and overturned. The engineer was killed and the fireman fatally injured. The train was moving at low speed, but there was a pushing engine at the rear which kept the derailed engine moving after it jumped the track.

24th, on Cleveland, Canton & Southern, near Chagrin Falls, O., the locomotive of a passenger train, which was running tender foremost, was derailed, and the tender was crushed beneath the engine. A brakeman was injured.

26th, on New Orleans & Western, at New Orleans, La., a passenger train was derailed and the engine was overturned. A brakeman was injured.

28th, on Illinois Central, near Vine Grove, Ky., a freight train was derailed and the engine and 12 cars were ditched. The engineer and fireman were killed.

29th, on San Antonio & Aransas Pass, near Dairy, Tex., a freight train was derailed and 5 cars were wrecked. Three trainmen were injured.

29th, on Omaha & St. Louis, near Burlington Junction, Mo., a passenger train was derailed and the engine and four cars fell down a bank. Three passengers and one trainman were injured.

29th, on Toledo & Ohio Central, at Dyesville, O., a

freight train was derailed and 9 cars were wrecked. A tramp was killed.

And 39 others on 28 roads, involving 3 passenger and 36 freight and other trains.

OTHER ACCIDENTS.

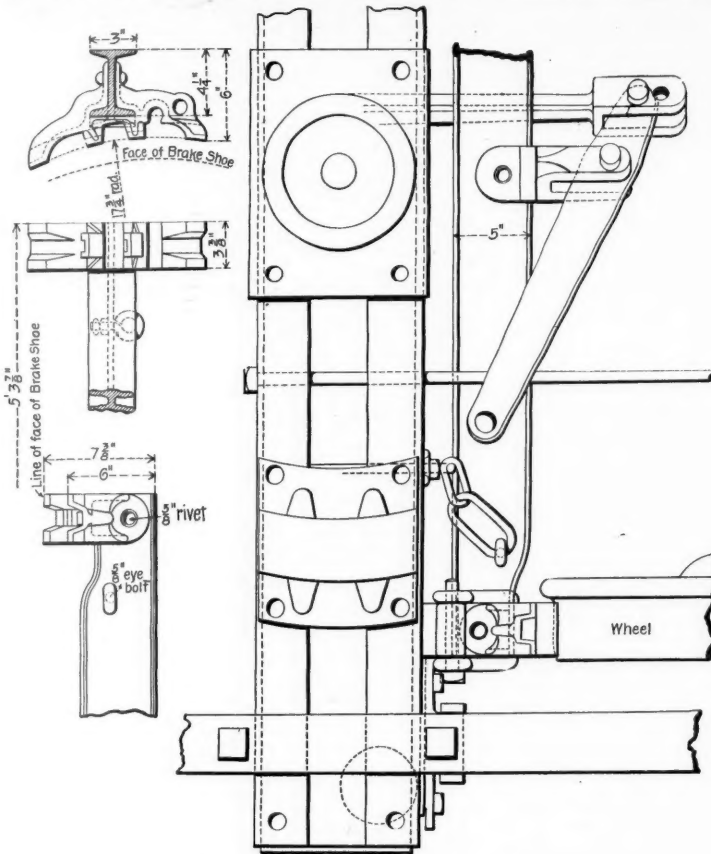
14th, on Iron Railroad, near Ironton, O., the locomotive of a freight train was wrecked by the explosion of its boiler. The engineer was killed and 4 other trainmen were injured.

And 5 others on 5 roads, involving 4 passenger trains and 1 freight.

A summary will be found in another column.

The "Solid" Brake Beam for Inside-Hung Brakes.

In our issue of Feb. 18 last was illustrated the "Solid" brake beam made of a straight 5-in. steel I-beam by the Monarch Brake Beam Company, Ltd., Detroit. This company is now putting on the market a modification of the "Solid" brake beam for use with inside-hung brakes where the distance between the spring plank and the wheels is not sufficient to per-



The Solid Brake Beam for Inside-Hung Brake.

mit of the use of the first style of beam. As shown by the accompanying engravings, the ends of the 5-in. I-beam are compressed in a bulldozer to a depth of 4 1/4 in., the thickness of the web being increased by the process in proportion to the reduction in depth. By this means the regular brake head can be used without cutting away the metal in the flange and hence reducing the strength of the beam. In view of the fact that it is generally conceded that the brakes should be hung inside the wheels, it is well to know that this can be done where the space is limited without weakening the brake beam.

The Carliss Center Strut.

The accompanying engraving shows a right and left-hand brake beam strut, as applied to Monarch brake beams, which is the invention of Mr. Thomas E. Carliss, Superintendent of the Monarch Brake Beam Co., Ltd., of Detroit, Mich. It will be seen that the fulcrum piece is separate from the body of the strut, and can be turned so that the slot stands in either direction. Between the outer end of the fulcrum piece and the main casting a rubber cushion is inserted which absorbs the vibrations and chatter of the brake shoes; the fulcrum piece is held in place and adjusted by means of a set screw. The claim made for this strut is that by reducing the jar and vibration the life of the brake rigging is increased, and there is less liability of the wheels sliding.

Is it Worth While?—A Letter to Young Men.

By William G. Raymond.*

An acquaintance of mine has a son who expects to be a civil engineer, probably a railroad engineer. He is a graduate in arts from a great college, and has proposed to take a degree from a technical school, attending its exercises for the necessary time, say two years. Before entering the technical school he has deemed it best to spend a year in the field, and in this decision he is wise. But with the delights of practical work, and observation as to the small

*Professor of Geodesy and Road Engineering in the Rensselaer Polytechnic Institute.

amount of theoretical knowledge required of the chairman, or the transit man, or even of the chief of party in railroad location and construction, comes the question: "Is it really worth my while to go back and spend two years in theoretical study?" He sees little to warrant such an expenditure of time. He is in the line of promotion, has a good general education—far better than that of most of the men around him and above him in position—and can it be that it is worth his while to break his connection and begin all over again two years later, with other college graduates in science, at \$50 a month and "found," or perhaps less? What should he do? This question comes in more or less this same way to many young men. My acquaintance asked it of me, and I unhesitatingly answered: "Oh, don't let him give up the school." Then said my friend, "When you go home sit down and write me an argument that I may present to my son."

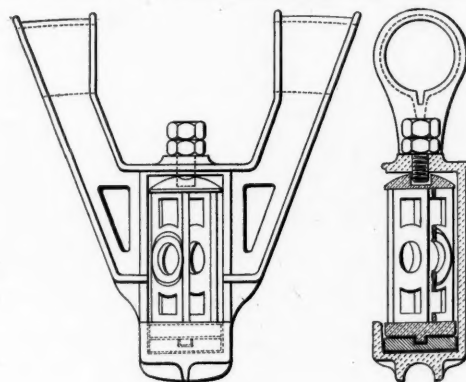
At home I sat down to reason the matter from the standpoint of the boy, and to try to formulate an argu-

ment to appeal to young men. The question reasoned itself in my mind in the somewhat crude and incomplete form that follows, and after presenting the statement to my friend I felt impelled to give it to the younger readers of the Railroad Gazette, in the hope that it may reach and influence some of the other young men who are asking themselves this same question.

This is so nearly my own case that it is of special interest to me. I went into the field because it was necessary for me to earn the cost of my schooling, and between the last two years of my school course, when I was earning \$100 a month in charge of construction work, and was offered more to go to another particularly difficult portion of the line, I was sorely tempted to believe that I had gone far enough in school; for, after all, what need I know beyond a little field geometry, if I possessed a "Trautwine" energy and judgment? My father advised me to go back to school, and, while I do not remember any argument that he used, I have always been glad that I followed his advice. But was it really best?

There is a very large and increasing amount of money invested in this country in technical schools. Has the technical school really no reason for being? Has the technically educated engineer no advantage over him who has no such training? He certainly has some. Let us see if it can be estimated.

The actual money value of an education cannot be stated. No more can its social value—a quantity that cannot be wholly separated from its money



The Carliss Center Strut.

value—be estimated. These considerations do not lessen the fact that some considerable value in both money and social units attaches to education. Some value is indicated when I say, as I can truthfully, that I have talked with many men on this subject, and every one who has stopped short of his full tech-

nical college course is sorry, while every one who has gone on to the end is glad that he did so. Most of them regret that they have not enjoyed an arts training as well, and many regret that they did not do better work when they had the opportunity.

I do not know of how much value it will be to say that the technical school training is broader than any that can possibly be obtained in a far greater length of time in professional practice. The young man in the field learns one way of doing something, and as he gains experience he varies the method. In

is the confidence that the trained engineer has in his design and work. He can go over his work before it is tested, and say that for the conditions for which it was designed it is right. Experience will teach him conditions to be met, theory will show him the best way to meet them.

Here is an item that has real definite value: The American Society of Civil Engineers accepts graduation from a technical school of good repute as the equivalent of two years of actual practice.

There are two kinds of engineers, the plodding

photograph. This joint, called by the Germans "Stossfangschiene," is patented by Messrs. Hoffman & Friedlander, the patent being No. 532,421 of Jan. 8, 1895. The theory and construction of the joint are perfectly apparent from the engravings.

Atlantic Type Locomotive for the Great Northern of England.

As heretofore noted in the Railroad Gazette, the Great Northern Railway of England has recently built from designs by Mr. H. A. Ivatt, Locomotive Superintendent, a 4-coupled passenger engine with all the driving wheels in front of the firebox, that is, of the Atlantic type. The appearance and general dimensions of this engine are shown in the accompanying engravings from a drawing and a photograph sent to us by Mr. Ivatt. The principal dimensions of the engine are:

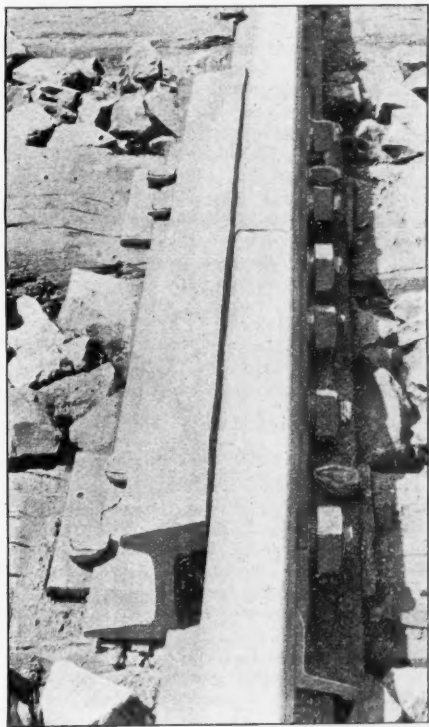
Weight on drivers.....	69,440 lbs.
" " front truck wheels.....	33,600 lbs.
" " trailing wheels.....	26,880 lbs.
" " total.....	129,920 lbs.
Wheel base, total, of engine.....	26 ft. 4 in.
" " driving.....	6 ft. 10 in.
" " total (engine and tender).....	48 ft. 5 1/2 in.
Length over all (engine and tender).....	57 ft. 11 1/4 in.
Height, center of boiler above rails.....	7 ft. 11 in.
Heating surface, firebox.....	140 sq. ft.
" " tubes.....	1302 sq. ft.
" " total.....	1442 sq. ft.
Grate area.....	267.9 sq. ft.
Steam pressure.....	175 lbs.
Drivers, diameter.....	79 1/2 in.
Truck wheels, diameter.....	43 1/2 in.
Cylinders, diameter.....	19 in.
Piston, stroke.....	24 in.
Main rod, length center to center.....	10 ft.
Tubes, number.....	191
" " outside diameter.....	2 in.
" " length over sheets.....	13 ft.

It will be noted that the tube plate is set back in the barrel of the boiler, as shown by the dotted line, so that the smoke box is really extended, though extended backward instead of forward. The main rod is 10 ft. long and the throw of the coupling rod is 1/2 in. less than that of the main rod, the pins being eccentric to that extent. The rear drivers carry about one ton more weight than the forward pair.

The engine is fitted with Macallan's movable blast pipe tube, with which the opening is 5 1/2 in. in diameter with the cap off and 5 in. with the cap on. The engine has steam sanding apparatus and connections for heating the train by steam. All the glands have the United States Metallic Packing Company's metallic packing. The tender will carry 3,650 gallons of water and 5 gross tons of coal. It weighs, loaded, 91,616 pounds.

Connecting Tracks of the Long Island Railroad and the Brooklyn Elevated.

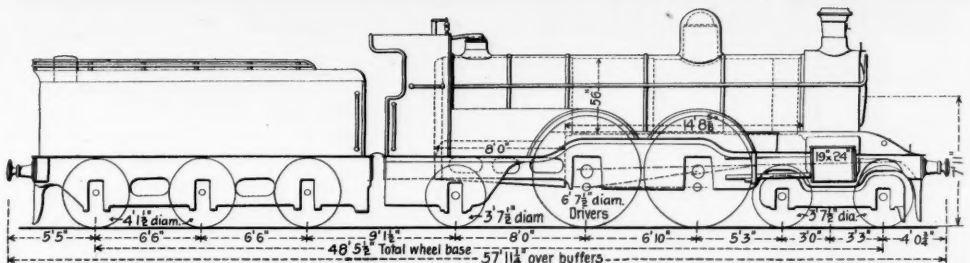
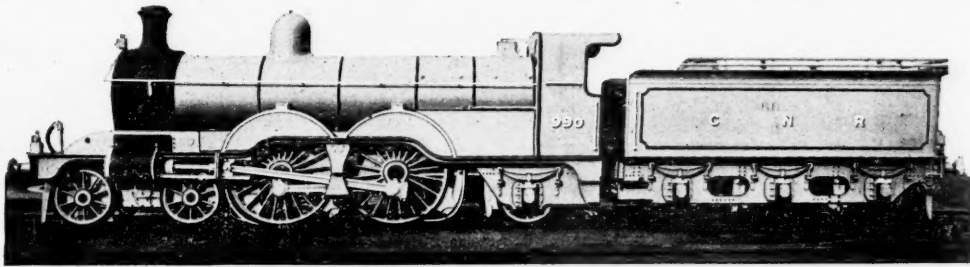
There was completed last week just south of the Cypress Hill Cemetery, Brooklyn, N. Y., a structure about one-fifth of a mile in length, by means of which the trains of the Long Island Railroad are enabled to run on the tracks of the Brooklyn Elevated. This connection has been completed in less than three months since the approval of the plans, as given in our issue of April 5 last. On Sunday of this week passenger trains were put in regular service, running



A German Rail Joint on the Pennsylvania Lines.

through from the Broadway Ferry, Williamsburg (Brooklyn), to Rockaway Beach. It will be some months yet before the Long Island trains cross the Brooklyn Bridge: the present congested condition of the bridge road and the changes and connections now being made renders it impracticable to run the trains over the river.

In the accompanying map, Fulton street runs near-



"Atlantic Type" Locomotive for the Great Northern of England.

school he may be learned in much less time that there are perhaps a dozen ways of doing this same thing, and that any one of several of them is better than the one method learned in the field. It is true that some practical operations are learned only in the field, but, if an engineer understands the principles involved in any operation, he is better equipped for emergency than if he knows method without principle. These statements are almost too general to be appreciated, and the young man asks that something of definite value be shown him.

Is it of any use to say that, while he has more general education, he has not so much special education as the majority of those high in his profession, and to answer his question by stating that for every one such as he has mentioned there are many of equal rank who were trained in a technical school? It ought to be a good argument to point to the great majority of the foremost engineers of the country as technical school graduates.

But perhaps I am more definite when I say that at the moment of writing these words I am in receipt of a letter from a locating engineer to a gentleman of my acquaintance, asking for information on a point in his work that can be answered by any one of the men in the senior class of almost any first-class technical school, and that this is not an unfrequent occurrence.

So, too, when I say that some of the most brilliant engineers of the world have made most woful blunders, and brought discredit upon themselves, simply because they were not well grounded in the principles of mechanics, I state a fact that can be understood. No man wishes to make blunders, particularly those

mathematicians, without whom we could not get on, and the managing engineers, who are equally, but perhaps not more, important. It goes without saying that the mathematician, the computer, the designing draftsman, could not exist without technical training, and it is true that his training is obtained quicker, more thoroughly, and in more useful form, in school than in the shop.

It is also true that the manager commands the higher compensation and is a more prominent person in his profession than the computer or designing draftsman, and that all young engineers of ambition seek to become of this class. But, with phenomenal exceptions, the manager does not spring into being without training. He rises slowly through all the departments of the business he may be connected with. If, other things being equal, he enters the drawing room with a technical training, his period of drudgery is shortened far more than the time spent in the school. Moreover, a man is far more competent to direct technical work if he has a technical education.

But to come now specifically to railroad engineering. Railroad engineering means a great deal more than laying out curves, setting slope stakes, or laying out and superintending a structure. It means hydraulics, steam engineering, bridge design and construction, masonry design and construction, strength of materials, metallurgy, electricity, architectural structure work, sanitary engineering, experience and common sense.

The last of these items, of undoubted importance, is not gained, contrary to an idea held by some, either in school or in the field. It is inborn. Without it no man will ever succeed, school or no school, practice or no practice. Experience is the only one of the items, and not indisputably the most important, that is wholly gained by doing.

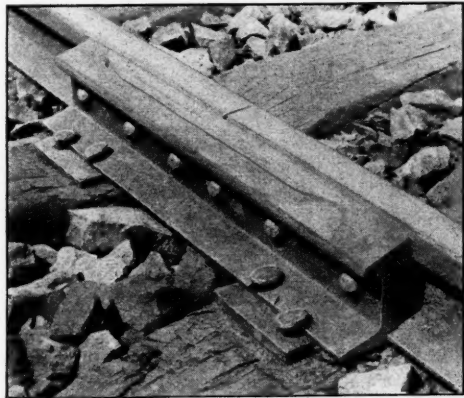
The principles underlying the other items are nowhere to be gained so well as in schools. The most successful railroad engineers are those that understand them. The chief engineers and the majority of the principal assistants of most of the great trunk lines are technical school graduates. Indeed, more than half the railroad mileage of the country has been built by the graduates of a single school.

But the young man argues: "I am not as this uneducated man. I have learned how to study. I can get all this technical knowledge by evening study, rainy-day study, and study at other times of leisure." Let me answer him thus: The time of no work does not come to the really useful man on a railroad. His study of the daily problems does not begin at 7 o'clock and stop at 6 o'clock; it begins when he wakes, and ceases when he sleeps.

Don't give up the school.

A German Rail Joint.

The rail joint shown by reproductions from photographs has been in the track of the Pennsylvania lines west of Pittsburgh for about six months and is giving satisfaction. About 10 miles of this joint have been put in on fast-running track, the rails being 60 ft. long and 95 lbs. to the yard. About the same number of joints is being applied this year. Mr. Loree says that the outside carrying bar was unfortunately rolled of steel somewhat softer than the rail and the result is some flow of metal, as is seen by the



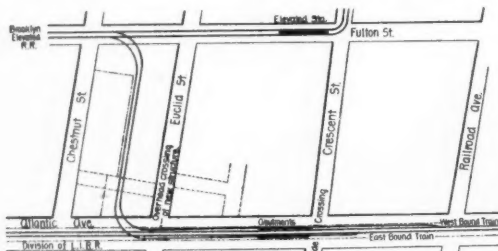
A German Rail Joint.

that show a lack of understanding of the principles of his calling.

Perhaps the following will be considered as indicative of some value in technical schooling: There is a recognition and standing accorded to the graduate of the technical school that is not accorded (with phenomenal exceptions) to other young engineers. Practical engineers seek almost wholly for technical school graduates for their assistants.

But perhaps most satisfactory of all the results of indefinite value of a technical training, though perhaps not so apparently satisfactory to a young man,

ly due east and west. This connection is about 6½ miles from the New York and Brooklyn Bridge and about a mile west of the intersection of Broadway and Fulton street. In leaving the surface tracks, the trains climb a grade first of 2½ per cent. until the beginning of the curve at Euclid street and Atlantic avenue is reached. Here the grade is reduced to 1½ per cent., and after rounding the curve is increased to 2 per cent. until Fulton street curve is reached. The grades of the westbound and eastbound



Connecting Tracks Between Elevated and Long Island Roads

tracks are about the same, but the latter tracks are about 2 ft. higher at the Euclid avenue curve. This will be shown by a profile in a later issue.

Messrs. A. & P. Roberts & Co. (Pencoyd Iron Works) of Philadelphia, furnished all the iron and steel, and the Cranford Company of Brooklyn did the masonry work, the principal part of which was the abutments on Atlantic avenue, as shown on the map. The consulting engineers of the Long Island road, Messrs. Jacobs and Davies, have had the supervision of the work.

Spain's Navy.

The editor keeps on his desk a list of Spanish warships on which he checks off those which are accounted for from time to time by our own fleets. The list as it stands to-day, follows.

Steel and Iron Armored Ships.	
Tons.	Tons.
Pelayo.....9,900	Princesa de Asturias.....7,000
Emperador Carlos V.....9,000	Vizcaya.....7,000
Numancia.....7,300	Almirante Oquendo.....6,800
Vitoria.....7,100	Cristobal Co. on.....6,800
Cardinal Cisneros.....7,000	Puig-cerda (monitor).... 550
Infanta Maria Teresa.....7,000	
Steel Protected Cruisers.	
Tons.	Tons.
Alfonso XIII.....5,000	Isla de Luzon.....1,030
Lepanto.....4,800	Marques de la Ensen- ada.....1,030
*Isla de Cuba.....1,030	
Unarmored Steel Cruisers—Now Used as Transports.	
Tons.	Tons.
*Reina Christina.....3,400	Alfonso XII.....3,090
†Reina Mercedes.....3,200	
Unarmored Iron Cruisers.	
Tons.	Tons.
Conde de Venadito.....1,140	Isabel II.....1,140
*Don Antonio de Ulloa.....1,140	*Velasco.....1,140
*Don Juan de Austria.....1,140	Jorge Juan.....935
Infanta Isabel.....1,140	
Steel Torpedo-Boat Destroyers.	
Tons.	Tons.
Audaz.....400	Prosperina.....400
Osado.....400	Furor.....370
†Pluton.....400	Terror.....370

In addition to the above, Spain at the beginning of the war owned eighty-four gunboats, ranging from 23 to 830 tons, four of which, "El Cano," "General Lezo," "Marques del Duero" and "Argos," were sunk at Manila, and another, the "Leyte," surrendered at Manila; sixteen steel torpedo boats, ranging from 25 to 108 tons; nineteen auxiliary vessels, ranging from 500 to 6,932 tons, of which the "Isla de Mindanao" was sunk at Manila, and the "Alfonso XII." at Mariel; three cruisers with wooden hulls of 3,342 tons displacement each, one of which, the "Castilla," was sunk at Manila; seventeen wooden steam vessels, ranging from 40 to 415 tons, carrying guns; eleven special service vessels, ranging from 670 to 5,600 tons, mostly obsolete; six tugs. Spain now has building nine warships, ranging from 750 to 11,000 tons.

*Destroyed at Manila.

†Destroyed at Santiago.

Electric Block Signals on the Boston & Albany.

BY GEORGE W. BLODGETT.

The Boston & Albany Railroad began the use of automatic signals nearly twenty-five years ago, and was the first railroad in the country to equip a long section of track with such signals for regular use; and here more than on any other railroad have been worked out the peculiar problems which have been developed by experience. It has been found out by actual service what are the correct principles and the safe limitations in the use of automatic signals. It is not too much to say that the degree of perfection to which the best systems have been brought would be still a long way off had it not been for the pioneer work done by this company in the early days when it was a new business, and the capabilities and necessary safeguards of such apparatus were not known. The officers of the Boston & Albany have learned by experience the merits and demerits of most of the systems in common use, and are acquainted with the best that has been done in this country and abroad, and know what degree of perfection in operation can be expected of this or that method or arrangement.

Some of the signal companies perceive and acknowledge their indebtedness to the experimental work of the Boston & Albany; others receive the

benefit without perhaps knowing to whom, or in what degree, they owe the results which have been attained.

Although there is a distinct advantage in the use of rail-circuits, because they indicate a broken rail or part of a train left in a section (which wire circuits do not pretend to do), yet the latter would efficiently protect trains, even with a very complicated service, were the absolute block system always used. But for one reason or another, it is almost everywhere deemed necessary or important to allow trains to enter blocks known to be already occupied, and it is then indispensable that the automatic signal at the entrance should be so affected that its control shall be transferred from the first train to the second. If still another, or any number of trains should enter

another of the three which are required governs its position, and not until all of the trains have left the block will the signal be set clear.

Although it may now be considered as well established that where it can be used the rail-circuit is the ideal, yet in an increasing number of localities it is subject to disturbance by outside influences. In mountainous districts the currents are often affected by large iron ore deposits in the earth, and sometimes where electric railroads are in close proximity they become unreliable; so that in such cases we are driven to adopting track instruments. Therefore, a brief description of the apparatus used on the Boston & Albany will probably be of interest. This method is equally suitable for electric roads (using the rails for a return circuit) on which, of course, rail-circuit signals cannot be used.

In the oldest and simplest application of track instruments there were required one instrument at the beginning of the block to bring the signal to danger, and another at the end to set it clear. With the new method four would be required for a single block, but as each track instrument is made to perform two or more operations no more are necessary, even for a continuous overlapping block system, than for a series of detached signals, operating independently of each other.

The normal course of the current for these signals when no train is in the block (see diagram) is from the copper pole of the battery by wire A and A₁ through the coils, and then the points of the relay P, then by wire 6 through the points but not the coils of relay Q; thence by wires R and S to the signal instrument S₁, and through the track instrument S T I₁, whence it returns by wire B to the battery. If this circuit is interrupted at any point the relay P is discharged and permanently opens it at the point p. The other circuits operated by trains are as follows (All these are normally open; no current flows through them except for the moment when the track instrument is operated):

(1) A circuit from the battery through the wires A and A₁, then through the upper coils of the interlocking relay or "double circuit instrument" No. 1 by wire 10 and spring c to wire D, through which it passes to the setting track instrument S T I₁, thence by wire B back to the battery. This circuit when operated makes at the point "a" in the double circuit instrument (hereinafter designated "D C"), a break in the wire through which the current must pass to set the signal all-clear, so that even if the circuit at the clearing track instrument be closed immediately after the train enters a block the signal would not be set clear.

(2) From A by A₃ through the upper coils of D C No. 2 and by wire T and track instrument C T I back to the battery by wire B.

(3) From A by A₃ through the upper coils of D C 2 (thus far exactly like the circuit last described), then by a new path through wire 13 and the lower or "restoring coils" of D C No. 1, thence by wire 12 and spring "g" through M to the track instrument S T I₁, of the signal next in advance and through a circuit breaker at that point, thence by wire B back to the battery. The effect of the operation of this circuit is to mend the break in the wire from C at the point "a" between wires 7 and 8 which was made by the operation of D C 1 when the train entered the block.

(4) The fourth and last of these circuits is from A by A₁ through the relay P, wire 7 and spring "a," wires 8 and 9, through the restoring coils of D C 2, then through spring "f" to wire C, whence it passes to the clearing track instrument C T I₁ through a circuit breaker and back to the battery by wire B. When relay P has drawn up its armature (which takes place almost instantly) a part of the current goes through the relay P by way of the point "p," wire 6, point "q," wires R and S to the signal, which it brings to the all-clear position; thence to the track instrument S T I₁, from which it goes by wire B back to the battery.

When a train enters the block it operates simultaneously the three circuits which pass through the track instrument S T I₁, the effect of which is as follows:

(a) It mends the break in the clearing wire of the preceding signal which the train had made when it entered the preceding block.

(b) It sets the signal S₁ to danger by the momentary breaking of the circuit at S T I₁, and the permanent interruption at the points of the relay P.

(c) A circuit is closed from the battery through the upper coils of the D C No. 1, the course being by wires A, A₁ and 10, spring c and wire D to the track instrument S T I₁, thence to B. This causes D C No. 1 to operate and opens the circuit of the clearing wire at the point "a" of this instrument. It is now impossible to clear the signal from the track instrument at the outgoing end of the block without first mending the break in this wire, which will be done by the train when it reaches the setting track instrument S T I₁ next in advance.

On its further passage into the block the train arrives at the track instrument marked C T I, where it performs two operations:

(1) It clears the signal at the entrance of the preceding block section.

(2) At the same time, by another circuit breaker in the track instrument, a circuit is caused to flow from the battery by A and A₃ through the upper coils of

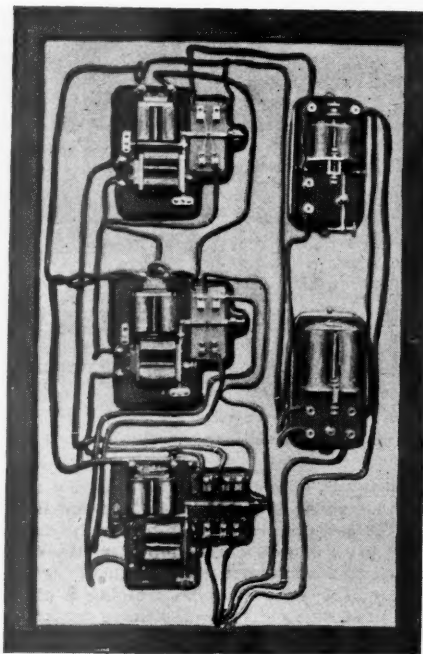


Fig. 2.—Electrical Interlocking Instruments for Hall Signals.

the block, the control of the signal should be handed on from one to another, always resting only with the last train, which alone should be able when it leaves the block to restore the signal to the normal arrangement, ready for another train to operate it.

Subject to the single condition that the trains be kept a little space apart (so as not to form virtually a single train on entering the block, afterwards separating and passing out as two trains), the Hall track-instrument system admirably meets the requirements. The Boston & Albany adopted this system long before the days when rail-circuit signals were made a practical success, and a considerable section of the road is still equipped with these instruments, which, much improved since they were first put in use, are still doing efficient service. As there arranged, the number of trains which follow each other into a block is immaterial; the system is reliable for



Fig. 3.—Boston & Albany Automatic Block Signal.

one or for all, if only they are a few hundred feet apart. This is made possible by the use of what are known as double circuit relays (which would more accurately be named "circuit controllers"), connected with the signal in such a way that now one, and now

D C No. 2, wire T, the track instrument and back by the B wire. When this double circuit instrument operates it transfers the circuit of the "D" wire from the point c to the point d; and the closing of d puts the third double circuit instrument in the same circuit with the first, the current then flowing through A2, wires 10 and 20, wire 11, point d, wire D, to the track instrument. This circuit includes one pair of magnets of D C No. 1 and one of D C No. 3.

There is commonly no further change until the train arrives at the next setting track instrument, marked S T I₂ on the plan. Here it sets the next signal S₂ to danger and sends a current forward through the "D" wire to unlock the first double circuit instrument of that signal, as before described. By another circuit breaker it completes a circuit from the battery by A3 through the upper coils of D C No. 2 and the lower coils of No. 1, which brings No. 1 back to its original position, thus mending at that point the break in the clearing wire C which was made when the train entered the block, and makes ready for the train to clear the signal when it arrives at the proper place. It is now possible, as it was not before, for the train, by operating the clearing track instrument, to send a current through wire C from A1 by way of the

proper place. In this system switches are connected to the signal instruments by causing the wire S to pass through a circuit breaker at each of the switches, which opens the circuit and sets the signal to danger whenever the switch is moved off the main line. Another wire, marked Sw on the plan, operates D C No. 3, thus preventing the train from clearing the signal behind itself by switching back and forth on the main track, or a fast train from clearing the signal behind a slow train which has just come out of a siding to follow it.

If a train has taken a siding and it should be necessary to clear the signal by hand, it may be done after the switch has been replaced by pressing for a moment on the double hand instrument key. This controls three circuits—from A4 through the upper coils of D C No. 3, spring e, wire C, and the hand instrument back to the battery; when this has operated the current passes by way of wire M from A3 to D C 2, wire 13, D C 1, wire 12 to M and the hand instrument, and finally from A₁ through relay P, wires 7, 8, 9 and C, just as when the signal is cleared by a train.

At a cross-over switch between two main tracks complete protection requires that the circuit of the

lated line wire, as would now probably be always done. The signal cannot therefore be set clear from either of these causes, and so far as the writer knows this scheme has never failed.

A system like the above is extremely flexible, though not more so, however, than some of the newer installations of rail circuit signals. It can be adapted to any case that has yet arisen, or conditions likely to occur in any kind or amount of traffic, subject only to the condition previously mentioned of keeping trains a short distance apart. This indeed is a safe and wise precaution, whatever be the plan of signaling, and introduces no serious difficulty or hardship.

At many junctions and terminals unusual conditions exist which require signalling arrangements of a special character, adapted to just those conditions. When these are known, the wire circuit can be arranged to fulfill the particular requirements. It is probably subject to fewer derangements, and under more perfect control than any other yet devised.

It is not here intended to draw any comparisons between wire circuits and rail circuits, or to belittle the special advantages of either, but to show that for some purposes, and for some conditions wire circuits

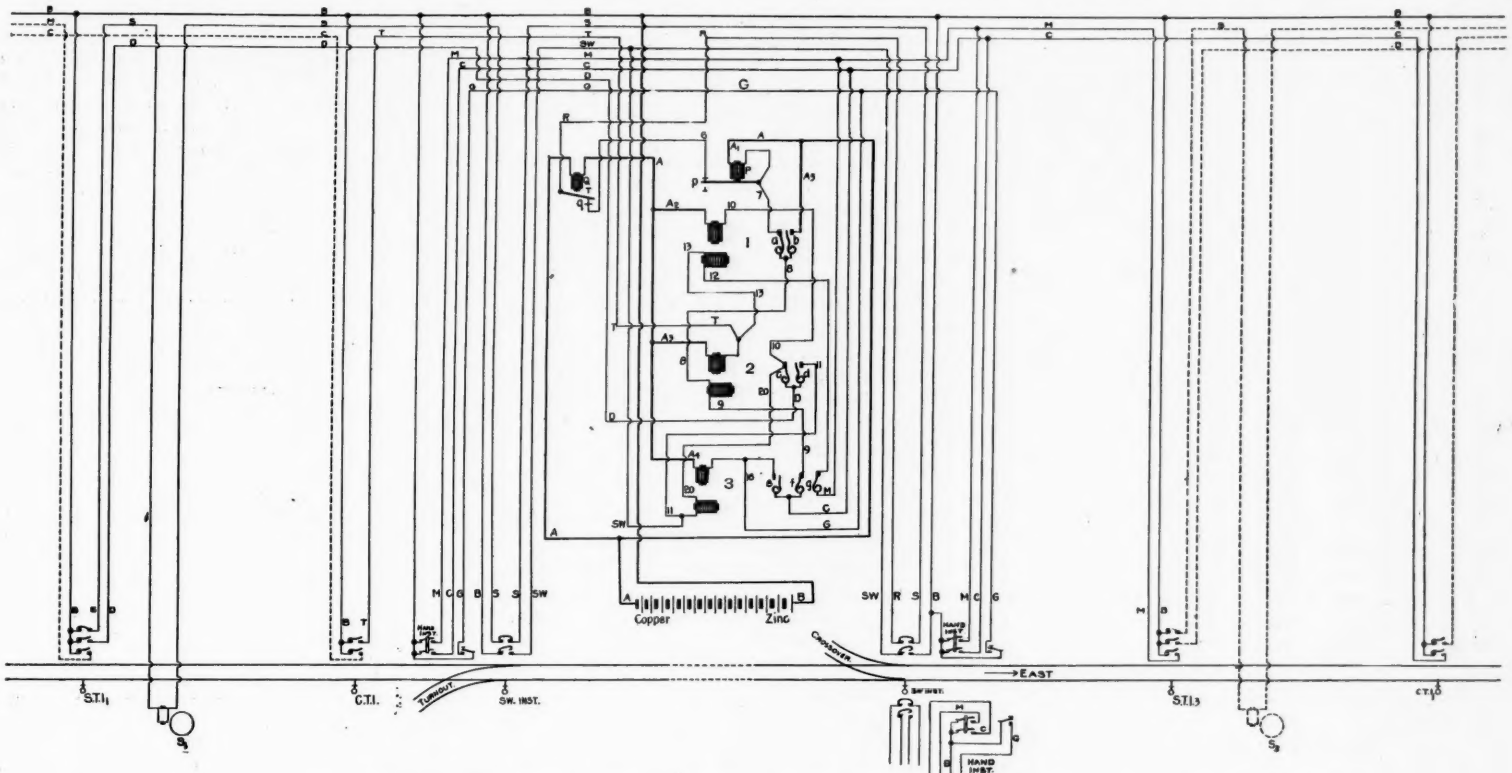


Fig. 1.—Electric Wiring for Hall Wire-Circuit Automatic Block Signals on the Boston & Albany Railroad.

relay P and wires 7, 8, 9 and spring f, thus closing the relay P, which draws up its armature. When this makes contact with its stop the circuit is complete from the battery through wire A, relay P, wires 6, R and S, through the signal and the track instrument; and that signal is restored to the all-clear position. This circuit is held closed by the constant passage of the current through the relay P until it is again interrupted by the arrival of another train, the opening of a switch or by some accident to the wires or instrument.

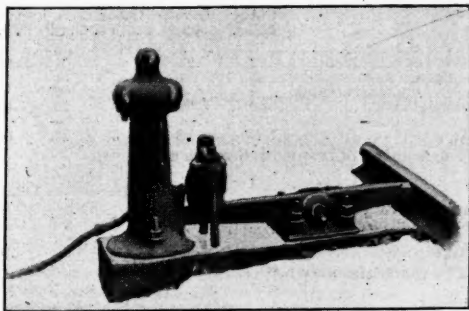


Fig. 4.—Hall Track Instrument.

If a train should enter a block already occupied it operates track instrument S T I₁ in the usual manner, but the current through the wire D, which before operated D C No. 1, now goes by a new path from A2 by wires 10, 20 and 11 through the restoring coils of D C No. 3 to the point d, thence as before through wire D to the track instrument, thus locking the coils of D C No. 3 and opening the springs f and g, while it closes spring e. The operation of the track instrument C T I₁ by the preceding train when it goes out of the block cannot now either mend the wire or clear the signal as it formerly could do, but can only unlock D C No. 3 and restore the circuits at that point to their original arrangement, so that the second train can clear the signal when it arrives at the

signals on each track should be operated by both the switches, to prevent a careless switchman from leaving a switch so that a train under too much headway or a runaway car could not pass to the opposite track and collide with a train on that track. This requires two more springs in the switch instruments and in addition a set of hand instruments at one end of the cross-over, and such an arrangement is shown in the diagram at the switch marked "cross-over." If both switches are thrown from one connection, as is the case in an interlocking plant or a two-lever switch and signal connection, then circuit breakers and hand instruments are needed only at one end of the cross-over, as one of the switches cannot be left wrong while the other is right.

If D C 3 has been operated by a switch and only one train goes out of the block in the regular way it cannot clear the signal, but would leave it in a position to stop a following train. To provide against this another special key in the same box with the first, distinguished from it by being white instead of black, is operated by the switchman after the switch has been replaced. This simply restores the third double circuit instrument and the train then takes care of the rest.

If a train enters the block meantime neither hand instrument should be used, but if done by negligence or mistake it will in most cases do no harm, as the train in passing the next track instrument will bring things again to their normal arrangement.

It will be observed that all of the circuits described, except that from A1, pass through the coils of relay Q, which is therefore operated and opens its points every time any of these circuits are closed. While the current is passing through relay Q the circuit of the signal S₁ is held open, thus keeping it at danger, no matter what may be done. This is to provide against a clear signal if the circuit-breaker in the track instrument should stick (as very rarely happens, but sometimes does occur in winter if water is allowed to accumulate around the track instrument and freeze), or if the line wires should be crossed in a certain way and keep the circuit closed through the clearing wire. Crosses can be avoided by using insu-

can better be used than rail circuits. There is no very great difference in the cost of installation; in the maintenance account the balance is usually in favor of the rail circuit, which requires about the same amount of labor, but usually somewhat less material. When the wire circuit is arranged on a normal danger plan the material consumed will be less than with the normally clear circuit; and simplifications may sometimes then be made in the circuits. The difference in cost of maintenance between

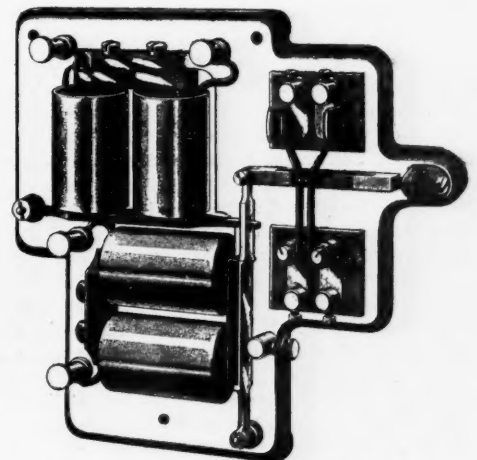


Fig. 5.—Electric Interlocking Instrument.

wire and rail circuits is not great enough to be in any sense a controlling factor in the choice, where either could equally well be used. Other more important considerations will come in to determine that matter, but the decision once made, it is important to put in the most satisfactory and economical installation possible.

If circumstances indicate that track instruments

(Continued on page 532.)



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.

As reported in our issue of June 24, a most important work was assigned to the M. C. B. standing committee on triple valve tests at the last convention, the work of testing the triple valves of all makers and reporting fully the results of the tests. There are many signs that the committee is determined to make a thorough investigation and that those who furnish inferior brakes will be made known. Perhaps no more important work has been undertaken by the Association since the Burlington brake tests. We are informed by Mr. Rhodes that as a preliminary step the removal of the testing apparatus from Altoona to Purdue University is being seriously considered. In fact, we understand that such a change is desired by the members of the committee, and that the Purdue authorities are prepared to furnish ample facilities for conducting the tests.

Our esteemed London contemporary, *The Engineer* (edited, we believe, by an Irishman) is somewhat puzzled over the naval fight off Santiago. It has to admit that the American fleet destroyed the Spanish fleet, but it can no more understand how this was done than it can understand how an American locomotive runs fast. The editor says: "It is difficult to believe that the American ships could have remained under full steam habitually, yet it is clear that they were so when the Spanish fleet came out, for in a few seconds the fleet was in motion. Had their fires been banked it would have been more like three-quarters of an hour." Again the editor says: "The Americans must, we think, have had some inkling of what was likely to come, or if not were under steam for some other reason and must have shown evidences of it." We venture to say that when the full official reports are made public that editor will be convinced that the blockade of the Spanish fleet in the harbor of Santiago was one of the most beautiful examples of sustained vigilance and discipline that he ever heard of. There is no probability that the ships of the blockading fleet lay off the harbor with their fires banked. There is, on the other hand, great probability that every one of those ships was always ready for instant motion and action. It is probable that a considerable number of them always had their engines turning enough to keep steerage way and that ammunition for the secondary batteries was always on deck, and that a round for the big guns was hoisted out of the magazines. If we are correct in this supposition we must remember further that this condition had to be maintained every second, night and day, for five weeks, and therefore it was, as we have said, a wonderful example of sustained vigilance and discipline. One pretty circumstantial account, which is said to have been written by an officer in the Iowa, says that within 20 seconds after the alarm was given the first shot was fired from that ship, and within two minutes every gun was cast loose and loaded and the men were at quarters

waiting for the order to fire. In those two minutes the Spanish ships, assuming that they came out of the harbor at a speed of 12 miles an hour, would have gone 700 yards. That is all that two minutes meant to them.

The Long-Distance Telephone.

The use of the long-distance telephone has diminished passenger travel on the railroads. The extent of the loss suffered by the railroads is not very well known and the importance of it is not admitted by all; but the newspapers have now and then given certain definite statements from well-informed men, like that published in the *Railroad Gazette* two weeks ago, and there can be no question that the value of the telephone is increasingly appreciated. Another bit of significant evidence, reported to us on good authority, is the statement of a railroad officer that the business of one of the limited trains between New York and Chicago has been practically ruined by the telephone. This comes from the chief executive officer of "one of the lines interested," and as there are only four or five roads interested in these trains the reader can perhaps guess where the statement comes from.

This result is not very surprising. One of the definite objects had in view in putting on 25-hour trains between New York and Chicago was the accommodation of brokers and business men of Chicago and the Northwest, who demanded quick time. Their trips to New York were taken on occasions of utmost importance, when a little time meant thousands of dollars. By means of the "Limited" the broker or business man was taken to New York in the quickest possible way. He talked as fast as he rode and made an equally quick return to Chicago. The business man was willing to pay the price assessed for this development in rapid transit.

The patronage of people whose time was less valuable to them was not expected to contribute much to the income of these trains, so that their whole dependence was expected to be, and was, on two classes; the business men aforesaid and pleasure travelers to whom a few dollars extra was not a noticeable item. Then came the introduction of the long-distance telephone. People at first were slow in realizing its benefits. Slowly but surely they have, however, come to appreciate its significance. A broker or grain dealer in Chicago has in mind a "big deal," he telegraphs to New York asking for certain information and adds: "Call me up by long-distance telephone and give me your answer." The result is that for 15 or 20 dollars a talk it held with the New York man. Having received the telegram he has had an opportunity to concentrate his expressions to the shortest possible statements; he has even jotted them down and at the proper time calls up his man and transacts his business. So it is done every day.

The railroad president quoted said that in the past he had found it necessary to spend about twenty days of each month on the road, leaving but ten days of his time at his office. But now, by aid of the long-distance telephone, he has reversed matters; but ten days are required on the road, giving him twenty days in the office. Half a dozen grain men who had been in the habit of making frequent trips between Chicago and New York said that for three or four dollars they could now transact business which formerly required a three day trip.

Some Generalities About Locomotives.

In a letter published elsewhere in this issue Mr. George S. Strong presents some of his ideas of what American locomotive practice is coming to, and, while it is undoubtedly true that the limits of clearances and allowable weight will some time be reached, yet we do not agree that "all well informed locomotive engineers acknowledge that nothing more can be accomplished on the present lines of construction." In fact, this is the first time we have ever heard the statement made.

Mr. Strong confines his remarks to passenger service, but we are inclined to believe that the limit of the capacity of locomotives will much sooner be reached in freight service and that the really serious problem is the limit of the weight of freight engines. Up to this time on the majority of roads the allowable weight on bridges has been one of the first obstacles which the motive power departments have met when designing new engines. With the exception possibly of a few roads having tunnels of small cross-section, the clearances have not prevented building as large engines as could well be used on account of the allowable weight.

We judge that it will be some time before it will be necessary to use 12-car trains stopping every 20 miles and making an average speed of a mile a minute, and if such conditions are ever presented the operating officers will probably find a solution for the problem, so that the same traffic can be better handled by smaller trains and smaller locomotives.

Mr. Strong's proposed design, however, contains some unusual features. The limit to the capacity of a locomotive is found in the boiler and a more powerful locomotive means greater boiler capacity and more heating surface. We infer that it is the intention to get a direct heating surface of 1,040 sq. ft., about five times the usual practice, by the use of a combustion chamber, and that corrugated furnaces would also be used. It is stated that this engine and tender could be turned on a 54-ft. turntable. There are good reasons why turntables should be from 70 to 75 ft. in diameter, and there is little use of placing such a limit on the length. We imagine that the engine in general would have a family likeness to the Strong engines which have appeared heretofore.

The idea of feed water heaters for locomotives is an old one, and while many different arrangements have been tried for heating the water before its introduction into the boiler, none of these has been used to any extent. This may be because a suitable heater has not been brought out, but in any event the addition of such a heater as Mr. Strong suggests would introduce complications which motive power men would adopt only as a last resort. We cannot help thinking that Mr. Strong is a long way ahead of the times and that there is still room for improvement along the present lines of locomotive practice.

June Accidents.

Our record of train accidents in June given in this number, includes 52 collisions, 88 derailments and 6 other accidents; a total of 146 accidents, in which 28 persons were killed and 131 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted, except where the circumstances of the accident as reported make it of special interest.

These accidents are classified as follows:

COLLISIONS.	Rear.	But-ting.	Cross-ing and other.	Total.
Trains breaking in two.....	7	0	0	7
Misplaced switch.....	1	2	1	4
Failure to give or observe signal. .	3	1	1	5
Mistake in giving or understanding orders.....	0	2	0	2
Miscellaneous.....	5	2	7	14
Unexplained.....	6	4	10	20
Total.....	22	11	19	52

DERAILMENTS.

Loose or spread rail.....	1	Runaway train.....	1
Defective bridge.....	1	Bad switching.....	1
Defective switch.....	1	Landslide.....	3
Soft roadbed.....	2	Washout.....	1
Broken wheel.....	5	Malicious obstruction.....	1
Broken axle.....	8	Accidental obstruction.....	1
Fallen brakebeam.....	4	Unexplained.....	52
Failure of drawbar.....	1		
Misplaced switch.....	1		
Bad loading.....	2		
			88

OTHER ACCIDENTS.

Boiler explosion.....	1
Various breakage of rolling stock.....	3
Other causes.....	2
Total.....	6

Total number of accidents..... 146

A general classification shows:

	Colli-sions.	Derail-ments.	Other acci-d's.	Total.	P. c.
Defects of road.....	0	5	0	5	4
Defects of equipment.....	7	29	4	31	21
Negligence in operating.....	25	5	1	31	21
Unforeseen obstructions.....	0	6	1	7	5
Unexplained.....	20	52	0	72	49
Total.....	52	88	6	146	100

The number of trains involved is as follows:

	Colli-sions.	Derail-ments.	Other acci-d's.	Total.
Passenger.....	11	16	4	31
Freight and other.....	84	73	2	159
Total.....	95	89	6	190

The casualties may be divided as follows:

	Colli-sions.	Derail-ments.	Other acci-d's.	Total.
Killed:				
Employees.....	4	16	1	21
Passengers.....	5	0	0	5
Others.....	1	1	0	2
Total.....	10	17	1	28
Injured:				
Employees.....	31	32	4	67
Passengers.....	24	35	0	60
Others.....	2	2	0	4
Total.....	57	70	4	131

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. Killed.	Pass. Injured.	Emp. Killed.	Emp. Injured.
Defects of road.....	0	13	2	9
Defects of equipment.....	0	12	4	11
Negligence in operating.....	5	24	4	33
Unforeseen obstructions and maliciousness.....	0	3	3	4
Unexplained.....	0	8	8	10
Total.....	5	60	21	67

Seventeen accidents caused the death of one or more persons each, and 34 caused injury but not death, leaving 95 (65 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with June of the previous five years shows:

	1898.	1897.	1896.	1895.	1894.	1893.
Collisions.....	52	40	40	40	39	72
Derailments.....	88	52	49	55	67	96
Other accidents.....	6	3	5	4	4	5
Total accidents.....	146	95	94	99	110	173
Employees killed.....	21	32	14	22	22	25
Others killed.....	7	13	19	13	14	15
Employees injured.....	67	47	37	51	74	104
Others injured.....	64	80	19	32	20	96
Passenger trains involved	31	41	30	20	35	55

Average per day:

Accidents.....	4.87	3.17	3.13	3.30	3.66	5.77
Killed.....	0.93	1.50	1.01	1.17	1.20	1.33
Injured.....	4.37	4.23	1.53	2.77	3.13	6.67

Average per accident:

Killed.....	0.19	0.47	0.32	0.35	0.32	0.23
Injured.....	0.90	1.33	0.60	0.83	0.85	1.15

The most fatal train accident in June was that of Tupelo, Miss., on the 26th. The circumstances of this collision are quite similar to those of scores of rear collisions on single track roads which have occurred in the past forty years; in fact, it once more reminds us what a small percentage of the worst collisions are due to pure forgetfulness or blundering. There is almost always something besides the simple "personal equation." The engineer was not very familiar with that division of the road, and had a roadmaster on the engine to assist in refreshing his memory of landmarks. We do not know, of course, but that the roadmaster saw that the speed was reduced as promptly as a regular engineman of that division would have done it, but, nevertheless, the engineman can claim that he was not blameworthy for his insufficient knowledge of the line, and thus there is introduced an unfortunate element of weakness in the road's position before the public and the courts.

Another feature of the collision, which plainly tells its own lesson, was that the car which was most seriously wrecked was in the center of the foremost train. Whether to put the weakest cars at the front or the rear of a train may be a debatable question, and it is possible to let a debate of this kind go on forever unsettled, but there is no question what effect a severe collision will have on a weak car placed between two groups of strong ones.

Another passenger train accident which was not fatal to passengers, but which had the possibilities of a bad disaster, was the derailment at Glen Onoko, Pa., on the 19th. A passenger train was badly wrecked near Shawsville, Va., on the 19th. The remarkable freight wreck at Naugatuck Junction, Conn., on the 21st, weakening a bridge, was reported in the Railroad Gazette of July 8. It will be observed that there were several other accidents in June from a similar cause. Indeed, the occurrence of derailments of this kind is now so common that they do damage to bridges quite frequently. Only a few months ago (April 5) a bridge 100 feet long was wrecked in this way near Hopewell Junction, N. Y.

There were nine collisions and derailments on street railroads in June, in which 45 persons were injured. In one of these cases, a collision on the Mason City & Clear Lake electric railroad, June 25, four trains were mixed up. After an entertainment at a picnic ground three trains of four cars each were started for Mason City, within a short distance of one another; the foremost train met and collided with a car running in the opposite direction and the three following trains together ran against the first, badly damaging two of the cars and injuring twenty persons.

The recent reduction in the price of anthracite coal at Chicago by the Delaware, Lackawanna & Western has been much discussed in the daily papers, and appears to be looked upon as conclusive evidence of a serious demoralization in prices which has prevailed beneath the surface for many weeks; in the east as well as in the west. The Anthracite Coal Operators' Association, an organization of minor operators, has been discussing the project of building a new railroad to the Atlantic seaboard for the purpose of compelling the existing roads to reduce their transportation rates; the high price charged from the mines to New York harbor being held to be the main cause of the depression in the business. Indeed, they have gone so far as to organize a company. But a railroad president who is well posted, and who is represented to be disinterested, tells a reporter of the Journal of Commerce that the difficulty lies deeper than that; he reminds the anthracite men that the whole trouble is in the low prices at which bituminous coal is sold. Soft coal perfectly adapted for steam purposes can be bought at New York at the price which anthracite costs at the mines. As long as this condition of things exists he believes that the railroads could not greatly improve the situation, even if they carried anthracite at cost. It is true that the low price of bituminous is largely due to suicidal rate-cutting of the railroads which carry it, but there is no help for the anthracite market until these roads can be made to advance their rates. Soft coal is sold in Philadelphia for \$1.10 and in New York for \$1.60, and

the railroads carry it at about two mills per ton per mile, which, this railroad president asserts, is unquestionably below cost. The view that the trouble with the anthracite market is the low price of bituminous is confirmed by the fact that the decline in the amount of anthracite sold in recent years has been in grate, steamer and lump sizes. The increased use of steam for heating and of gas for cooking has also hurt the market for anthracite.

The St. Paul & Duluth has lately abolished the practice of refunding 10 cents to each passenger paying fare on a train. It appears that the Great Northern and the Northern Pacific also collect excess fares and pay no portion of the fare back to the passenger. By the way, why does not a rebate order require a two-cent revenue stamp? We have heard that the new tax law was what caused this action of the St. Paul & Duluth, though the other two roads have, we believe, retained the excess for many years past. On some Eastern roads, where the sum refunded on a fare is only five cents, the tax, if imposed, would absorb a pretty large proportion of the value of the order.

The Chicago-Denver lines have finally reached an agreement to withdraw the fast trains and it will be done next month. These trains have been a constant source of irritation and fruitless discussion, and it is safe to say that the net passenger revenue of the lines has been materially reduced since they were put on.

NEW PUBLICATIONS.

Railway Construction. By William Hemingway Mills, M. Inst. C. E., Past President of the Institution of Civil Engineers of Ireland and Engineer in Chief of the Great Northern Railway of Ireland. New York, London and Bombay: Longmans, Green & Co.; 1898. Large octavo, 366 pages; numerous illustrations and index. Price \$5.

Mr. Mills announces in his preface that his object has been to describe briefly some of the recognized leading features of railroad construction with sketches of work selected from actual practice. No allusion is made to the requisite strength of the various structures described or to the necessary dimensions of the materials. Neither is any mention made of the probable cost of the different works of construction. The aim appears to have been to give the reader a general view of the subject, leaving him to go elsewhere for such information as will qualify him to actually do the work.

The first chapter treats of location, touching upon the mechanical and commercial questions involved, and gives in detail the government regulations in England and the requirements of the British Board of Trade. The second chapter deals with all that part of construction which prepares the road to receive the ties and rails, and this naturally includes bridges, tunnels and culverts. The third chapter is on permanent way; the fourth on stations and other buildings; the fifth on yards, turn-tables, etc.; the sixth collects data as to weights, wheel base, etc., of some types of modern locomotives; the seventh deals with signals and block working, and the eighth is a general chapter on development in the direction of greater speed and weight, of electricity as a motive power, etc.

As a collection of examples of practice the volume will doubtless be suggestive and useful to the young engineer practicing in the British Islands. To the American reader it can have but little value as a guide in practice. It will have, however, a considerable interest to those American readers who like to know accurately and in detail how people outside their own borders build and maintain railroads.

The whole book has a flavor of antiquity and solidity. The methods described by the author would make a good, durable railroad beyond any doubt, but obviously he is not always abreast of modern practice. His remarks, for instance, on brakes might have been written 25 years ago. He says: "Every goods waggon should be fitted with a brake, and it would be of immense value if that brake could in all cases be applied and controlled when the train is in motion." He then describes with particularity the ordinary American hand brake as used on a box car. He dwells through a couple of paragraphs on the advantages of being able to "sprag" your wheels, by which he means putting in a piece of wood between the spokes. "The sprag is a piece of wood circular in section about 2 ft. 6 in. long, 5 or 6 in. thick in the middle, tapering off to about 2 in. thick at the ends." This is inserted between the spokes and caught against the underframe, holding the wheel fast, to skid on the rails. We are gravely informed that solid or close wheels cannot be spragged, "and for this reason alone it would be very desirable that in every passenger and goods train there should be some spoke, or open, wheels, which could be spragged as a last resource."

We recall that it was on the Great Northern Railway of Ireland that the most disastrous railroad accident occurred which has taken place in the United Kingdom for many years, perhaps ever. This was in June, 1889, when seven cars of a heavy excursion train ran back down grade and into the head of a following train and 83 passengers were

killed (eight more than at the Tay bridge) and 260 were injured. There was only one hand brake on the seven cars, and the power brake (non-automatic) was inoperative because the engine had been cut off to take the forward part of the train over a hill. Probably this sad occurrence has fixed in the mind of the author of this book the notion of the importance of being able to sprag your wheels, but how queer it all sounds to the American railroad man knowing the power and efficiency of an automatic, compressed-air brake.

It is not fair, however, to judge the book by such quotations as we have made of the author's opinions concerning brakes. The book is not by any means rank nonsense. It is really a very good, circumstantial, detailed account of standard English practice in ordinary foundations, bridge work, under-track structures, track, sidings, signals and many other things.

Prismoidal Formulae and Earthwork. By Thomas U. Taylor, C. E., University of Virginia; M. C. E., Cornell University; Assoc. M. Am. Soc. C. E.; Member American Mathematical Society; Professor of Applied Mathematics, University of Texas. Octavo, cloth, X+102 pages, numerous cuts. New York: John Wiley and Sons. 1898. Price \$1.50.

The object of the author, as stated in his preface, is twofold: "To present a ready method of estimating the usual quantities in earthwork computations by graphical methods and to confine these diagrams to as few as possible" and "to discover the original author of the usual formulae associated with the prismoid." A chapter on two-term formulas, and some formulas and diagrams for cost of earthwork are given. The two-term discussion is from a thesis presented by the author to Cornell, and the cost diagrams are based on the figures given in Trautwine.

From the stated object of the book it will be inferred that it has been prepared for both the mathematician and the practicing engineer. The mathematician has been best served, as outside of the diagram for earthwork, which is practically a diagram of the equations used by Prof. J. B. Johnson in making his earthwork tables, there is little new matter of value to the engineer, and the book is hardly full enough for a text-book, though it will serve well as a basis for class room lectures. The method given for computing overhaul, although perhaps in use somewhere, is not the usual method.

The historical matter and the demonstrations of the limitations of the various formulas are interesting, and the author's style is terse and clear. The book will be of interest to mathematicians and particularly to teachers of field geometry.

Directory to the Iron & Steel Works of the United States. Embracing a full list of blast furnaces, rolling mills, steel works, rail mills, structural mills, etc.; also bridge building and ship building works, car axle, car wheel and car building works, locomotive works, etc., to which is added a complete list of the iron and steel works of Canada and Mexico. Compiled and published by the American Iron & Steel Association; James M. Swank, General Manager. Fourteenth edition, corrected to April 1, 1898. Philadelphia: The American Iron & Steel Association, 261 South Fourth street. Octavo, 380 pages. Price \$7.

We printed July 8, page 494, a pretty full abstract of the preface to this, the fourteenth edition of Mr. Swank's invaluable directory. It only remains now to announce its actual publication. This edition retains the old features of the preceding editions and has a number of new ones. In the 1896 edition the first complete list of malleable iron works was given. To this there are now added complete lists of rail mills, structural mills, steel casting works, bolt, nut and rivet works, chain works, seamless tube works and riveted pipe works.

The reader who has occasion to consult a directory of this sort has long ago learned that that of the Iron & Steel Association is unique and indispensable. Lists of works of the different classes are given by states and also are made convenient and available by ample indexes.

Railroad Rates; Miscellaneous Bulletin No. 15. United States Department of Agriculture, Washington, D. C.

The Division of Statistics of the Department of Agriculture, has issued this pamphlet of 81 pages for the purpose of giving to the farmers of the country a history, for the past 30 or 40 years, of the rates of transportation by rail and water on principal agricultural products and also on merchandise used by farmers. There is also a number of tables of passenger rates. The pamphlet contains in all 72 tables. These give average rates per ton per mile on many roads, and in some cases going back as far as the year 1846; various rates on coal, average rates on miscellaneous commodities New York to western cities, rates on grain Chicago to Kansas City, rates by the Erie Canal on iron ore and lumber on the Lakes, provision and hay rates by steamers on the Mississippi River, and transcontinental rates.

For the historian, this pamphlet contains a large amount of matter, though much of it is already available in reports of railroad companies and of the New York and Chicago commercial bodies where trade statistics are made up; but whether it will ever be read by more than half a dozen farmers is a question on which we are a good deal in doubt.

TRADE CATALOGUE.

Locomotives.—The Dickson Manufacturing Co., of Scranton, Pa., sends an illustrated catalogue of locomotives built at the Dickson Locomotive Works. In the introduction we are informed that the company has established such a system of standard gages and templates as will enable it to make like parts of a locomotive of a class exactly duplicate and interchangeable and to furnish at any time duplicate parts. It is said that especial care is given to the construction of boilers. A large modern boiler shop has just been erected and equipped. A hydraulic riveting machine of 150 tons capacity, bending rolls and a large plate edge planer are some of the new

which has been designed for "flat workings" in coal mines, has a head clearance of but 36 in. above the top of the rail. Air pressure at 700 lbs. per square inch is stored in six Mannesmann tubes. This main storage system is made up of two series, each with suitable shutoff valves and filling connections. With this arrangement, should any connection fail in one series, it could be cut out and the other used. The arrangement of storage tubes between the frames leaves no room for the use of links and eccentrics, and the Walschaert valve gear is used.

Graphite as a Lubricant.—The Joseph Dixon Crucible Co., Jersey City, N. J., sends us its 1898 pamphlet on "Graphite as a Lubricant." Our good will and

of Dixon's perfected graphite was added the bearings were run nearly six times longer at the same rate of speed. Experiments by Prof. Albert Kingsbury also indicate the superiority of combined oil and graphite over lard or mineral oils. A few pages are devoted to remarks on the use of graphite for cylinders and bearing surfaces of locomotives.

The Lidgerwood Safety Derrick Engine.

Experience has shown in handling a derrick with movable boom, using a double drum hoisting engine, that none but the most expert enginemen can be depended upon for rapid work and safe handling, the changes of motion necessary where the maximum

capacity is desired being so rapid that accidents more or less serious frequently occur. With the Lidgerwood safety derrick engine a comparatively small amount of skilled labor is required, and the operator can increase the rapidity of handling the engine with absolute safety to the men below the derrick, and at the same time maintain an erect and natural position.

This engine is substantially the Lidgerwood standard friction drum engine, with the addition of a safety lever lock attached to foot brake of the boom fall drum, and a friction lever latch on the hoisting drum.

The friction lever latch on hoisting drum enables the man who runs the engines to hold the drum in any desired position, as when taking up a load with the hoisting fall and desiring to lower the boom at the same time.

The friction is thrown in on the hoisting drum, and it is impossible through any slip or inattention for the load to drop, while the operator may give his whole attention to the lowering of the boom. With the safety lever lock on foot brake of boom fall drum, as shown in Fig. 2, one motion of the foot sets the brake, which cannot be released without throwing the friction in position, and when this is done it automatically releases the foot brake and holds the catch away from the brake till the boom is put in the desired position, when the brake is again set with the foot.

By the old method it was necessary for the man controlling the engine to give his attention to the two friction drum levers, two foot brake levers, two ratchets and pawls, and the steam lever, placing himself in an awkward position, in which it was almost impossible to watch the load and the signalman at the same time.

In the new way of working a double drum derrick engine, where the safety appliances have been at-

tached, he can stand erect in a natural and easy position, and is thus enabled to see every signal, whether given from the pit or from the point where load is dumped, both hands and feet being available for handling the boom while the load is being hoisted. In Fig. 3, the friction lever latch holds the lever where it is set, and relieves the right hand of the operator. This engine may be seen at the warerooms of the sole manufacturers, the Lidgerwood Manufacturing Company, 96 Liberty street, New York City.

Electric Block Signals on the Boston & Albany.

(Continued from page 531.)

should be chosen and that particular circuit be selected which is best adapted to the existing conditions, its application at each important place should

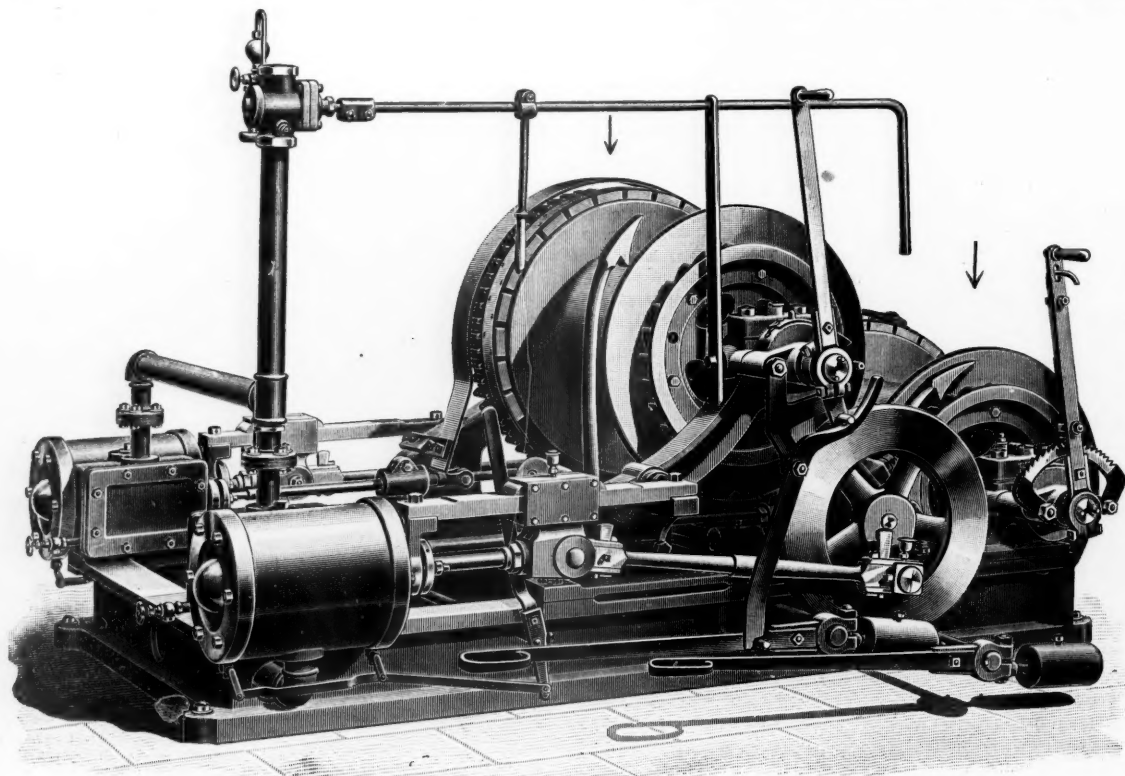


Fig. 1.—The Lidgerwood Safety Derrick Engine.

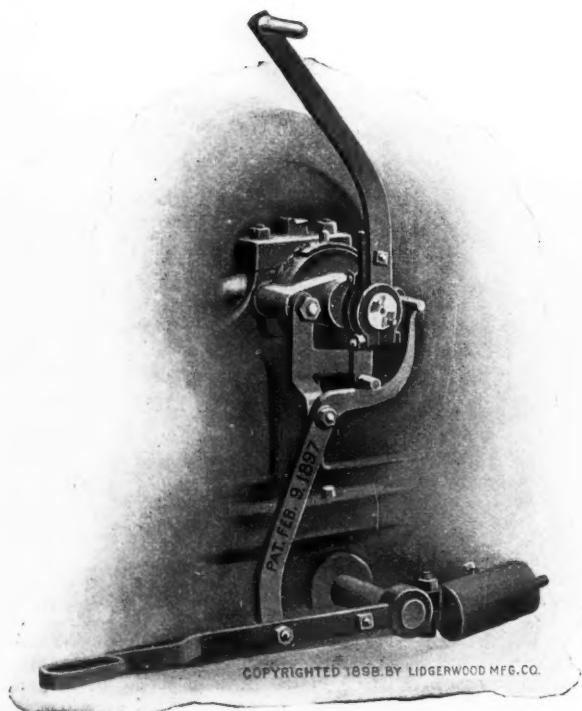


Fig. 2.—Safety Lever Lock on Foot Brake of Boom Fall Drum.

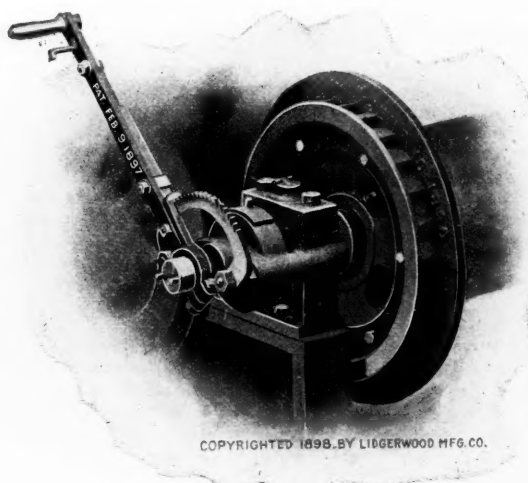


Fig. 3.—Friction Lever Latch on Hoisting Drum.

tools. The new furnaces are so large that the largest sheets can be heated at one time.

The catalogue gives formulas and data for calculating hauling capacity of locomotives. The illustrations and tabulated descriptions give particulars of a considerable variety of engines, and especially of tank locomotives, although a number of large road engines for some of the most important railroads are shown.

The company builds compound engines under the patents of Mr. F. W. Dean, whose designs are well known to the readers of the Railroad Gazette. The general arrangement of this system and a detail of the automatic starting valve are shown, with descriptions of the special apparatus. Two examples of compressed air locomotives for mine work, cotton wharf work and the like are shown. One of these,

gratitude are immediately won by the first sentence in the letter accompanying the pamphlet, namely: "We want to call your attention to the fact that its contents are made up chiefly of the contents of the 1897 edition. We have given it a new cover and some four pages of new matter." Surely anybody who has the consideration to save the time and labor of the poor editor by such a statement deserves a "good notice." The catalogue contains the results of tests made on lubricants some years ago by Prof. R. H. Thurston, the first of which shows that under the same number of pounds pressure and traveling at the same rate of speed, graphite did nearly three times more work than the best quality of winter sperm oil. The second test indicated that the grease tested without the graphite gave no better results than the sperm oil, but when 15 per cent. by weight

be worked out in detail under every actual or possible combination of circumstances which might occur, before any construction work is done, in order that no important condition may be overlooked, to the end that no abnormal condition of traffic at an unexpected moment shall affect the signals in a way not provided for. If this is properly done, we may install such a system in confidence that never under some unforeseen contingency will the signals fail or give false indication and lure a train into danger by the assurance of a safe track when a switch is open or the block occupied.

On the Boston & Albany each signal is placed about 200 ft. in advance of the track instrument that sets it at danger. This is to allow the engine man to see the signal operate when his train enters the block. This not only makes him carefully observant of the position of the signals both before and at the moment when the train enters a block, but gives him greater interest and confidence in the signals, and much facilitates the prompt finding and repair of slight derangements when they occur, since the engine man is required to make as prompt report as possible of any failure or abnormal working. Where this is done, the system may be kept in a very high state of efficiency. This plan is disapproved by quite a large number of railroad managers, but the writer believes that it has decided merit. It has now had the test of many years' practical service, without demonstrating any serious objection which is founded on experience, and his own observation confirms his tentative opinion of several years ago, that there is a great advantage in having the working of the signal for each train carefully observed. A failure is then promptly detected and remedied, while under the other arrangement it might go on indefinitely time undiscovered, as it is not then made the business of any person on the train to see the working of the signals, and there may be many cases of derangement which are unknown. Also by this arrangement, if a failure does occur, the trainmen know it first of all, and can take proper steps to protect themselves.

As far as possible batteries are placed in station buildings or outhouses, but for a signal a long distance from a station this is not convenient, and shelter must be provided where needed. They are usually put in a well or cellar a few feet under ground, with a small house over it which contains the double circuit instruments and furnishes a place to store material and allow the men to do battery work in winter or severe storms without being exposed to inclement weather, or getting the batteries too much chilled.

Connection between the line wires on the poles and the track and switch instruments is usually made with rubber-covered wires in an iron pipe, this having proved satisfactory, as it allows a defective wire to be drawn out and another substituted in a short time, without digging or removing any part of the apparatus. A connection box on the pole just below the cross-arm covers the end of the pipe and keeps out the water.

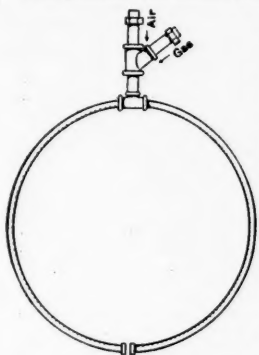
Natural Gas for Shrinking on Tires

Among the many interesting uses to which natural fuel gas is put is that of heating locomotive tires for shrinking on.

The illustration shows a form of circular burner for this purpose which is in use at the shops of the Pittsburgh Locomotive and Car Works, Allegheny, Pa.

The burner is made of 1½-in. gas pipe, put in the form of a ring, about 6 in. larger than the diameter of the tire. It has two rows of ½-in. holes which are staggered 1 in. apart. An air blast is used at five ounces pressure to the square inch, the natural gas being under pressure of about three ounces.

From 15 to 20 minutes are required to heat a tire, but the time varies slightly according to the size.



TECHNICAL.

Manufacturing and Business.

The Standard Railway Equipment Co. of East St. Louis, Ill., has filed a certificate of incorporation. The incorporators are: P. H. Murphy, C. E. Rodenberg and W. A. Rodenberg. The capital is \$50,000.

Albert Cardozo has been appointed Receiver for the firm of Thornton N. Motley & Co., 43 John street, New York, in a suit brought by Thornton N. Motley against his partner, Francis Farmer Fox, for a dissolution of the partnership on account of dissensions between the partners.

Chicago grain doors were specified on 500 cars recently ordered by the Northern Pacific from the Michigan-Peninsular Car Co., and on 500 ordered by the same road from the Illinois Car & Equipment

Co., 1,000 in all. Also, on 1,000 cars for the Chicago, Milwaukee & St. Paul, to be built at West Milwaukee.

The Northern Pacific has placed an order with the Bucyrus Co., of South Milwaukee, Wis., for two 60-ton steam shovels to be used in heavy ballasting work.

The Dressel Railway Lamp Works, New York, has given the Engineering Laboratory of Purdue University a complete outfit of locomotive lamps, consisting of one pair of Herculean engine classification lamps, one steam gage lamp and one water gage lamp.

John F. O'Rourke, 44 Broadway, New York, has received a contract for eight pneumatic cassettes for the foundation of the residence to be built at 11 and 13 East Sixty-second street, New York, by Mrs. Margaret L. V. Shepard. Work will be commenced immediately.

The Hooker Steam Pump Co. of St. Louis, Mo., has been incorporated with a capital of \$30,000, all paid, by J. E. Gorman, W. D. Hooker, W. C. Farrer and R. L. McLaren.

Iron and Steel.

The Spanish-American Iron Co. has notified its stockholders that its mines at Baiquiri, 20 miles from Santiago, will be in operation in two months.

The American Tube and Iron Co. has recently made a shipment of 15 car loads of 10-in. pipe to the South African Republic.

The British steamer Venus has sailed for Vladivostok loaded with 11,230 tons of rails, 6,799 bundles of plates and 4,606 boxes of bolts and spikes, making the sixth cargo sent to that port with parts of the order given to the Maryland Steel Co.

The Hanson & Hurford Steel Casting Co. of Chicago has been incorporated with a capital stock of \$50,000 by J. A. Hanson, W. D. Hurford and B. E. Tilden.

The Baltimore & Ohio has purchased 40 miles of 55-lb. rails 60 ft. long.

D. O. Mills is quoted as saying that as he understands it there has been but one preliminary conference looking to the consolidation of the Illinois Steel Co., Minnesota Iron & Steel Co., Pennsylvania Steel Co. and Cambria Iron Co., and that he is inclined to be opposed to the combination in the proposed form of consolidation, but that if proper terms can be arranged he thinks it will be a benefit to all concerned.

The Sheridan Iron Works Co., Sheridan, Pa., is repairing Sheridan No. 1 furnace and will put it in blast this fall if the market justifies them in doing so.

The Illinois Steel Co. having secured a force of men to take the place of the strikers, has started the Milwaukee blast furnaces.

According to the report of the Board of Directors of the Bethlehem Iron Co., South Bethlehem, Pa., the net earnings for the year were \$1,083,000. The total receipts were \$4,832,050, while the total expenses, depreciation, etc., amounted to \$3,748,705. Two dividends of \$200,000 each were paid and the balance of \$683,000 was placed to the credit of the profit and loss account, which now amounts to \$5,369,100. The report also shows an excess of current assets over current liabilities of \$3,139,722. The capital stock is \$5,000,000 and the funded debt is \$1,351,000 of 5 per cent. bonds, due Feb. 1, 1907. The unfinished orders on the company's books are \$6,500,000, which does not include \$1,000,000 for armor and forgings for Russian war vessels.

New Stations and Shops.

Some time ago we stated that the Board of Trade of Mansfield, O., had asked the Pennsylvania and the Baltimore & Ohio to consider substituting a Union station for the present separate stations at that point. We are advised by the Pennsylvania Company that nothing further has been done.

We are advised that nothing further has been done in the matter of moving the Memphis and Charleston shops to Sheffield, Ala. We stated some time ago that this was under consideration.

Nothing definite has been agreed upon between the Illinois Central and the Wabash regarding the building of a Union depot at Decatur, Ill.

Interlocking.

The Pennsylvania Railroad has nearly completed a new interlocking plant at Rockville, five miles west of Harrisburg, at the junction of the Northern Central. There will be 102 working levers.

The Union Switch & Signal Co. is to put in an interlocking plant at Galveston, Tex., with a machine of 36 levers, for the Gulf, Colorado & Santa Fe, the Galveston, Houston & Henderson, the Galveston, La Porte & Houston and the Wharf Co. These signals will protect the crossings at 35th, 36th and 37th streets and avenues B, C and D.

An interlocking plant with a machine of 16 levers has been put in at the crossing of the Central of New Jersey and the Lehigh Valley roads at Sugar Notch, Pa.

The Simplon Tunnel.

The Swiss journals give information of the contract which has been closed between the Jura-Simplon Company and the contracting firm of Brand, Brand-rau & Co. The work will consist of the construction of a single track tunnel about 19,730 meters long and eventually of a parallel tunnel 17 meters distant from the first with transverse galleries connecting them. The first tunnel and the preliminary gallery of the second will be finished and put in public use 5½ years after the beginning of the work. A premium of 5,000 francs a day will be paid in case this limit is anticipated and a fine of 5,000 francs a day will be imposed for delay beyond this limit. The estimate of cost is for the installations at the north and south ends, the railroads of communication, the shops, hydraulic machinery, ventilators, compressors, dynamos, rolling stock and electric lighting plant, 7,000,000 francs; for the first tunnel with ballast already to receive the rails and the auxiliary gallery of the second tunnel and transverse galleries 47,500,000 francs; total, 54,500,000 francs. The tunnel company assumes on its side a burden of 4,320,000 francs for land damages, rails, straightening the bed of the Rhone general expenses, etc. Thus the total cost of a single track tunnel with the auxiliary gallery for the second tunnel will be 58,820,000 francs. The price of the second tunnel will be 15,000,000 francs, to which the company will add 1,220,000 francs for track, etc. An illustrated technical description of this work appeared in the Railroad Gazette of Dec. 28, 1894. The contract now made annuls the one made Sept. 20, 1893.

Master Car Builders' Association.

The Secretary of the M. C. B. Association has issued several circulars, from which extracts follow:

The Rules of Interchange, as revised at Saratoga, N. Y., in June, which go into effect on Sept. 1, 1898, will be ready for distribution about July 25, and will be furnished at the same rates as heretofore.

The Air Brake and Signal Instructions, as revised at Saratoga, N. Y., in June, 1898, will be ready for distribution about Sept. 1, and will be furnished at the same rates as heretofore.

At the Convention of 1898, the matter of marking the light weight upon cars and having them corrected from time to time as necessity requires, was discussed, and in view of the increasing practice of loading locomotives on a tonnage basis, the matter was referred to the Executive Committee for consideration. The Executive Committee has instructed the Secretary to call the attention of all car owners to the importance of stenciling the light weight upon their cars, and of correcting it when the occasion requires, in order to facilitate the business of economical operation. All car owners are, therefore, hereby requested to give this matter prompt attention, and to arrange for the correct light weight to be properly stenciled upon their cars.

At the Convention of 1898, the Secretary was instructed to urge upon all car owners the importance of publishing a complete classification of all cars which they own or control, such publication being regarded as of great advantage to all concerned and practically essential to the satisfactory transaction of business with the operating lines. In furtherance of this object, the Executive Committee instructed the Secretary to suggest the Railway Equipment & Publication Co., 24 Park Place, New York City, as a suitable medium through which to disseminate this information in complete form.

A New Steamer for the Chesapeake.

The steamer Tennessee, being built for the Baltimore Steam Packet Company by the Harlan & Hollingsworth Co., of Wilmington, Del., has been successfully launched and will be completed about Sept. 1. This vessel will have accommodations for nearly 300 passengers, including 75 state-rooms. The Tennessee will be capable of carrying 300 tons of freight and will have facilities for loading and discharging cargo quickly.

The Torpedo Boat Destroyer Farragut.

The torpedo boat destroyer Farragut was launched July 17 from the yard of the Union Iron Works, San Francisco. The boat is of 273 tons displacement and is 210 ft. long and 20 ft. beam. The maximum draft is 6.3 ft. The contract price was \$227,500. We understand this is the first torpedo boat destroyer built on the western coast.

Experiments on Durability of Telegraph Poles. On the Philadelphia, Wilmington & Baltimore 42 telegraph poles have been set for a test of the life of different woods. The poles are divided as follows: Six chestnut poles, creosoted; six pine poles, creosoted; six chestnut poles, woodline, six set in broken rock, six in clay, six in the ordinary manner, and six to have a hole bored near the ground so they can be saturated with oil.

The Pig Iron Production in June.

The figures given in production of pig iron for the month of June, as published in the Iron Age, show a further falling off in production of pig iron. On July 1 there were 185 furnaces in blast with a weekly capacity of 216,311 gross tons as against 190 furnaces in blast June 1, with a weekly capacity of 225,398 gross tons, and against 145 furnaces in blast July 1, 1897, with a weekly capacity of 164,064 gross tons. Stocks sold and unsold on July 1 amounted to 805,311 tons against 823,382 on June 1.

THE SCRAP HEAP.

Notes.

At Ottumwa, Ia., the cashier of the Adams Express Co. has been held on a criminal charge to answer to the Grand Jury for not complying with the law rela-

tive to the use of a stamp for each shipment sent by express.

Near Dafter, Mich., on the Minneapolis, St. Paul & Sault Ste. Marie, July 12, two tramps being put off a passenger train shot three of the trainmen. A few days before the brakemen of a freight train on the Pennsylvania road had a somewhat similar experience near Elizabeth, N. J., though no one was seriously injured. A Rock Island passenger conductor and his crew had a hard fight with tramps at Corbin, Kan., July 9.

The car shops of the Central of New Jersey at Elizabethport, N. J., were destroyed by fire on July 16, together with three locomotives, seven passenger cars and a large collection of patterns. Adjoining dwelling houses were also badly damaged and the total loss is said to have been \$300,000. The passenger station of the Illinois Central at Champaign, Ill., was burned down July 12.

The United States Circuit Court at Denver, Col., has decided that the Colorado Midland must bear the losses due to the collision on the Rio Grande Junction Sept. 10, 1897. In this collision 13 passengers and five other persons were killed; a westbound passenger train of the Denver & Rio Grande met an eastbound cattle train of the Colorado Midland, the conductor and engineman of the latter violating the rules regarding the right to the road.

On the night of July 16 the express car of a train of the St. Louis & San Francisco was robbed at Andover, Kan., and a man on the station platform who tried to intercept the fleeing robbers was shot dead. About 1 o'clock on the morning of July 14 a passenger train of the Southern Pacific was stopped by robbers in the desert east of Humboldt, Nev. The express car was wrecked by the use of dynamite and the contents of the safe were carried off.

The Canadian Special Commission.

President McKinley has appointed John W. Foster, John A. Kasson, Representative Dingley and Senators Spooner and Gray, Commissioners, on the part of the United States, to meet Commissioners appointed by the British Government to consider questions on which Canada and the United States disagree.

The Egyptian-Soudan Railroads.

The French journal, *La Journal des Transports*, regrets to be obliged to announce that the Egyptian-Soudan Railroads are to be sold to a private English company. This is looked upon as a practical seizure of these railroads by England and with them all the commerce of the Soudan. The French hope that this transfer will be defeated.

Conduit Electric Lines on Sixth and Eighth Avenues, New York.

On Wednesday of this week the Metropolitan St. Ry. Co. began to rebuild its horse car lines on Sixth and Eighth avenues, the former running from South Ferry to 59th street and the latter from Broadway and Canal street to 59th street. The work was begun at the upper end of the lines and the horse cars on these routes have been taken off to be again placed in service as the work is completed. The material for building the line has been on hand for a long while, so that no important contracts have been let for this work, which is entirely under the direction of the Metropolitan Co. The Sixth avenue route was given in our issue of March 5, 1897, together with the routes of the lines which have been or will be changed to the conduit electric system. The company recently placed an order with the Brill Co. for 100 closed cars, to be used principally on the lines now under construction.

Decision in Safety Valve Case.

A decree for injunction and account has been given in the Circuit Court, district of Massachusetts, in the case of the Ashton Valve Co. vs. Crosby Steam Gage & Valve Co. The opinion of the court rendered July 7 is in part as follows: "The gist of the complainant's invention as stated in the third claim of the patent and in the argument of counsel, is a steam regulating device in a pop safety valve, which device extends above the muffler and can be operated without the removal of the latter. That similar devices not extending above the muffler, were previously in use in pop safety valves, is admitted. See patents 485,699, 488,020. That a steam regulating device which can be operated without the removal of the muffler is a useful piece of mechanism, is clear, but it is hard to see how an extension through the muffler of the device shown in either of the two last mentioned patents involves more than the skill of the ordinary mechanic. There is uncontradicted testimony to the effect that half the muffled safety valves now sold owe their sale to the patented pop regulation of the pop. Under these circumstances, though with considerable doubt, the patent in suit is held to be valid."

The Manufacturers' Building at Providence.

One of the best equipped power buildings in the United States is the Manufacturers' Building, Providence, R. I. This building has accommodations for upward of 60 manufacturing concerns. The Manufacturers' Building Company has just purchased a 250 KW., 500 volt Westinghouse Electric & Mfg. Co.'s engine type generator, 100 r. p. m., to be driven by an Armstrong & Sims Corliss engine. This generator will supply power for the operation of motors in the various departments of the building. The engineering features of this establishment are under the direction of Lewis & Claflin, consulting engineers.

Electricity in Copper Refining.

The development of electrolytic processes for the production of refined copper has proceeded rapidly during the past three years, and a large proportion of all the refined copper is thus produced. The Westinghouse Electric & Manufacturing Company has installed much apparatus for this service. One of the principal installations is at the refinery of the Anaconda Copper Company, Anaconda, Mont., where 10 generators of 270 to 300 KW. capacity have been installed. Another large installation is that of the Boston & Montana Consolidated Copper & Silver Mining Company, Great Falls, Mont., where two 810 KW. Westinghouse engine type generators are in service. The latest comer is the Raritan Copper

Works of Perth Amboy, N. J., which is about to erect the largest copper refinery in the East, and has contracted with the Westinghouse Company for three 600 KW., 150 volt, engine type generators, 150 r. p. m., with a 9-section switchboard for electrolytic service and the operation of two 75 KW., 220 volt, engine type generators, which will be used for lighting and power service.

Congressional Committees.

The committee to investigate railroad mail transportation during the summer consists of Senators Allison, Chandler and Faulkner and Representatives Moody (Mass.), Catchings (Miss.), and Fleming (Ga.) Senator Wolcott and Representative Loud, chairmen of the committees of the Senate and House, are ex officio members of this committee. The Industrial Commission, to investigate labor questions, consists of Senators Kyle, Penrose, Mantle, Daniel and Mallory and Representatives Gardner (N. J.), Lorimer (Ill.), Lovering (Mass.), Livingston (Ga.), and Bell (Col.) Nine other members are to be appointed by the President.

A "Technical" Editor Makes a Discovery.

Last week one of our esteemed "railway and engineering" contemporaries gave a conspicuous place in its instructive and enterprising columns to the following:

"The passenger rolling stock of the Boston & Albany R. R. has for some time been equipped with a compressed air whistle apparatus, which consists of a line of small rubber tubing connecting with the air brakes and leading to a whistle in front of the engineer in the cab. Should the train break apart, the whistle will immediately notify the engineer, just as the parting of the air brake tubes automatically sets the brakes. An order has been recently issued providing that all passenger rolling stock belonging to the Boston & Maine Railroad be thus equipped before July 1, and this has been done."

An innocent country editor reprints these words of wisdom and adds:

"The B. & A. and the B. & M. are to be congratulated on their enterprise as well as on the high standard of their engineman."

LOCOMOTIVE BUILDING.

It is stated that the Pittsburg Locomotive Works are building one locomotive for the Chesapeake Bay Construction Co.

The Baldwin Locomotive Works have received another contract for a composite car from a western railroad—this time in Southern Ohio.

It is reported that the Chicago & East Illinois has placed a contract with the Pittsburg Locomotive Works for seven consolidation locomotives.

It is rumored that the Duluth & Iron Range is considering buying locomotives. We have not been able to get this confirmed up to the time of going to press.

In our July 8 issue we noted that the Wheeling Bridge & Terminal Co. had ordered one locomotive from Pittsburg Locomotive Works. This order was for six switching engines.

The Northern Pacific has placed orders with the Schenectady Locomotive Works for 14 locomotives, instead of seven, as noted last week. Of these engines, seven will be 10-wheel engines and seven heavy consolidations.

It is probable that the order for the 10 locomotives for the Union Pacific noted in our issue of last week will be placed in New York as follows: Two compounds with the Schenectady Locomotive Works, and eight simple engines with the Brooks Locomotive Works.

In our issue of July 8 we noted that the Monterey & Mexican Gulf was in the market for six freight engines. These will be 10-wheel simple engines, weighing 110,000 lbs. with 81,400 lbs. on drivers. The cylinders will be 19 x 24 in., drivers 56 in. in diam.; boilers, 73 in. long; working steam pressure, 160 lbs.; fireboxes, 74 in. long, 34 in. wide; capacity of tanks will be 4,000 gals. of water and four cords of wood; cabs will be of iron. The locomotives will be equipped with Westinghouse air brakes, steel axles, cast iron brake shoes, Monitor injectors, metallic rod and valve packings, cast steel springs, Star Brass Mfg. Co.'s gages, cast steel tires on all the wheels, with cast steel centers.

CAR BUILDING.

The McCaw Mfg. Co. is having five cars built by Murray, Rougal & Co.

The Erie Car Works are building six freight cars for the Germania Refining Co., Oil City, Pa.

The Michigan-Peninsular Car Co. is building three refrigerator cars for the Cudahy Refrigerator Line.

The Russel Wheel & Foundry Co. is building 20 freight cars for the Minneapolis, St. Paul & Sault Ste. Marie.

The St. Paul & Duluth order for 200 cars noted in our issue last week has been placed with the Wells & French Co.

The Chesapeake & Ohio has not placed an order with the Michigan-Peninsular Car Co. for 1,000 box cars, as rumored last week.

We are officially advised that there is no truth in the rumor reported last week that the Oregon Short Line is in the market for passenger equipment.

It is reported that the Union Pacific has ordered 1,150 cars from the Michigan-Peninsular Car Co. We are reliably informed that the order is off and will be readvertised.

The Haskell & Barker Car Co., Michigan City, Ind., has been awarded a contract by the Central Railroad of New Jersey for 500 box cars. We noted some time ago that this road would order these cars.

It has been reported that the American Express Co. is preparing specifications for palace horse cars for special service on the Cleveland, Cincinnati, Chicago & St. Louis. We are advised by the express company that it is not building any cars, but that it has been remodeling some not properly ventilated.

The Northern Pacific has placed an order with the

Rodger Ballast Car Co. for 200 80,000-lbs. capacity ballast cars. These cars will be fitted with 80,000-lb. Common Sense steel body and truck bolsters, and coal sides to be used in handling coal in winter. They will be built under contract with the Wells & French Co. Delivery is to be completed by Sept. 1.

In our issue of July 8 we noted that the Monterey & Mexican Gulf was in the market for 100 box cars. These will be numbered from 500 to 599, will weigh 28,600 lbs., will be of 60,000 lbs. capacity, and will measure 34 ft. 1 in. long, 8 ft. 2½ in. wide, 8 ft. 8½ in. high. They will have steel axles, oak bolsters, oak brake beams, cast iron brake shoes, Westinghouse air brakes, Standard brasses, standard journal boxes and lids, galvanized iron roofs and Dickson wheels. The company does not know when bids will be opened.

Last week we noted an order placed by the Flint & Pere Marquette with the Michigan-Peninsular Car Co. for 250 box cars. These cars will weigh about 33,000 lbs. and will have a capacity of 60,000 lbs. They will be 37 ft. long outside, 9 ft. 1¼ in. wide outside and 7 ft. 9 in. high. The cars will have steel axles, Marden brake beams, Westinghouse brakes, Q & C door fixtures, Kirby draft rigging, C. B. Hutchins & Sons' roofs, Detroit Steel & Spring Co.'s springs, diamond trucks, Harrison patent dust guard. Twenty-five of the cars will have Simplex bolsters and the balance Fox pressed steel bolsters.

The 250 box cars ordered by the Flint & Pere Marquette from the Michigan-Peninsular Car Co., as mentioned in our issue of last week, are to be of 60,000 lbs. capacity. They will weigh about 33,000 lbs., and will be 37 ft. long outside, 9 ft. 1¼ in. wide outside and 7 ft. 9 in. high. These cars will be equipped with steel axles and Fox pressed steel bolsters will be used on 225 cars and Simplex bolsters on the rest. Marden brake beams, Westinghouse air brakes, Q & C door fixtures, Kirby draft rigging, C. B. Hutchins Sons' roofs, Detroit Steel & Spring Co.'s springs, diamond trucks and Harrison patent dust guards will also be used.

In our issue of June 24 we noted that the Pullman's Palace Car Co. is building 1,000 freight cars for the Chesapeake & Ohio. These will be box cars of 60,000 lbs. capacity, weighing 31,300 lbs.; will be 36 ft. long inside, 8 ft. 2¼ in. wide inside; 13 ft. ¾ in. high to top of running board, and will be built of wood. They will have wrought iron body bolsters and sandwiched truck bolsters, cast iron brake shoes, Westinghouse brakes, Tower couplers, Q & C door fastenings, C. & O. standard doors, Butler drawbar attachments, M. C. B. standard 4¼x8 in. journals, and C. & O. standard brown paint; Chicago-Cleveland roofs; arch bar trucks; 33 in. Griffin cast iron wheels.

Last week we noted that the Chesapeake & Ohio had placed an order with the Ensign Mfg. Co. for 500 coal cars. One hundred of these will be flat bottom gondola cars, weighing 31,700 lbs., measuring 38 ft. 1½ in. long over end sills; 9 ft. 10 in. wide, 8 ft. high. The other 400 will be hopper bottom gondola cars, weighing 34,160 lbs. each, measuring 28 ft. long over end sills, 9 ft. wide, 11 ft. ½ in. high. The cars will be built of wood and will have a capacity of 80,000 lbs. They will have combined iron and wood bolsters, cast iron brake shoes, Westinghouse brakes, Tower couplers, Butler drawbar attachments, M. C. B. 5 in. x 9 in. journals, black C. & O. standard paint, arch bar trucks, 33 in. cast iron Ensign wheels.

In our July 8 issue we noted orders placed by the Wabash with the St. Charles Car Co. for two chair cars and five coaches, and with the Barney & Smith Car Co. for three chair cars. The following are some of the specifications: Weight, 39 tons; length, 63 ft. inside, 71 ft. ½ in. over buffers; width, 10 ft. ½ in. over crown moldings; height, 14 ft. top of rail to top of roof. The cars will be built of wood and metal with metal underframes. The axles will be iron, 4¼ in. x 8 in. M. C. B. journals; bolsters, wrought iron; curtain fixtures, Hartshorn rollers, Forsyth Bros.' shade attachments; brake shoes, cast iron Christie, Westinghouse brakes, brass brasses filled with babbit metal, Gould couplers, Gold's duplex double-coil heating system, malleable iron M. C. B. journal boxes, Drexel journal box lids, Pintsch light; seven center lamps, two vestibule lamps, three holders, Gould platforms, wood roofs covered with the best quality of cotton ducking, six-wheel trucks, Wabash standard; Gould vestibules. 33 in. cast iron wheels weighing 600 lbs. each, will be used.

The Chicago City Railway has placed an order with the John Stephenson Co., of New York, for 100 motor cars.

BRIDGE BUILDING.

AITKIN, MINN.—Bids for rebuilding a wagon bridge over Ripple River, at Knox St., Aitkin, will be received by the village council until July 23. F. M. Shook, President.

ANNAPOLIS, MD.—The commissioners of Anne Arundel County will receive bids until July 26 for building two pile bridges, one across Curtis Creek and one across Cabin Branch. A. K. Stirling, Clk.

BATAVIA, O.—A new bridge will be built over East Fork in Jackson Township; estimated cost, \$5,000.

CHICAGO, ILL.—The Sanitary District Trustees have filed a petition in the County Court for the condemnation of 35,000 sq. ft. of land bordering the Chicago River at Taylor St., owned and used by the Chicago Terminal Transfer, Rock Island, Lake Shore & Michigan Southern and the Northern Pacific R.R. companies. The river is to be widened to allow the drainage canal to receive the necessary 30,000 cu. ft. of water at that point, and a bascule bridge is to replace the old center pier structure.

CINCINNATI, O.—The Commissioners of Hamilton County will receive bids until Aug. 10 for superstructure and approaches of bridge over Miami canal on Township Ave., Millicreek township, Eugene L. Lewis, Co. Aud.

COTTAGE CITY, MASS.—Hon. Josiah Quincy, Mayor of Boston and President of the Martha's Vineyard R.R., has petitioned the Massachusetts Harbor and Land Commissioners for permission to build a

bridge across Lagoon pond, between Cottage City and Tisbury. A hearing will be given July 27.

NATCHITOCHES, LA.—The city will build an iron bridge across Johnson Chute, near Natchitoches. George W. Kile, Pres., Police Jury.

NEW HAVEN, CONN.—The Board of Aldermen has authorized an issue of \$290,000 in bonds for building of certain bridges. The committee has recommended that bridges be built at Chapel St. over Mill River, to cost \$150,000; at Derby Ave., to cost \$20,000, and one at Willow St., to cost \$10,000.

NEWPORT NEWS, VA.—The City Council has passed an ordinance to issue \$40,000 bridge bonds for building three new bridges.

NORRISTOWN, PA.—Bids are asked until Aug. 10 for building the masonry work on three bridges. D. H. Pittner, County Clerk, can give further information.

PITTSBURG, PA.—Plans have been prepared for a steel bridge crossing the Monongahela at Tenth St., to cost over \$200,000. Plans are also completed as follows: For the improvement of the Point bridge; for rebuilding Lincoln Ave. bridge over the Pennsylvania RR. at Ben Venn station, and for a new steel bridge to span the hollow between Butler St. and Morningside Road.

POMONA, MO.—The St. Louis, Siloam & Southern will require two bridges. (See Railroad Construction column.)

READING, PA.—The Council has appointed a committee to consider the question of a bridge over the Reading Railroad tracks in the northern part of the city.

ST. JOSEPH, MO.—Bids are asked until Aug. 24 for building and repairing eight bridges. Thomas Stinacker, County Surveyor, may be addressed.

SIDNEY, O.—It is stated that bids are wanted until Aug. 3 for the superstructure of a hoist bridge at Water St. J. S. Laughlin, Auditor, Shelby County.

TOWSON, MD.—B. H. Mays, Bridge Superintendent for Baltimore County, has reported to the Commissioners that the bridge over White Marsh run, on the Philadelphia road, and the bridge over Herring run both need repairing. W. J. Robinson, Clerk of Howard County, notified the Baltimore County Commissioners that the Woodstock bridge, owned jointly by the two counties, is in need of repairs.

WILKESBARRE, PA.—Appropriations for the new county bridges, amounting in all to over \$25,000, have been made. The items in the appropriations include for the most part bridges to cost less than \$1,000. M. L. Driesbach, Clerk, Luzerne County.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Great Northern.—Preferred, quarterly, 1½ per cent., payable Aug. 1.
Huntingdon & Broad Top.—Preferred, semi-annual, 2½ per cent., payable Aug. 1.
New York, Pennsylvania & Ohio.—Common, semi-annual, 1 per cent.
Northern Central.—Semi-annual, 3 per cent., payable July 15.
Northern Pacific.—Preferred, quarterly, 1 per cent., payable Sept. 5.
St. Paul, Minn. & Man.—Guaranteed, quarterly, 1½ per cent., payable Aug. 1.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:
American Association for the Advancement of Science will meet in Boston Aug. 22 to 27 inclusive.

American Society of Civil Engineers.—Meets at the house of the society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month at 8 p. m.

American Street Railway Association will hold its annual meeting at Boston Sept. 6 to 9.

Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.

Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month at 7.30 p. m.

Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.

Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

Chicago Electrical Association.—Meets at Room 7, 137, Monadnock Building, Chicago, on the first and third Fridays of each month at 8 p. m. J. R. Cravath, secretary.

Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.

Denver Society of Civil Engineers.—Meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth street, on the third Thursday of each month, excepting July and August, at 7.30 p. m.

Engineers' Club of Columbus (O.).—Meets at 12½ North High street on the first and third Saturdays from September to June.

Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

Engineers' Club of Philadelphia.—Meets at the house of the club, 1123 Girard street, Philadelphia, on the first and third Saturdays of each month at 8 p. m., except during July and August.

Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

Engineers' Society of Western Pennsylvania.—Meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month at 7.30 p. m.

Locomotive Foreman's Club.—Meets every second Tuesday in the clubroom of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.

Montana Society of Civil Engineers.—Meets at Helena, Mont., on the third Saturday in each month at 7.30 p. m.

National Railroad Master Blacksmith Association.—Sixth annual convention, Boston, Sept. 6.

New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.

New York Railroad Club.—Meets at 12 West Thirty-first street, New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August.

Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

Northwestern Track and Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m.

Society for the Promotion of Engineering Education will hold its annual meeting at the Massachusetts Institute of Technology, Boston, Aug. 18 to 20.

Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.

Street Railway Accountants' Association of America will hold its second annual meeting in Boston Sept. 6 to 9.

Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month at 8 p. m.

Eastern Railroad Commissioners' Club.

This club, an informal association of state railroad commissioners of the six New England states and New York, held its semi-annual meeting at Moosehead Lake, Me., July 13. The President of the club is B. F. Chadbourne of Maine.

Iron and Steel Institute, British.

In accordance with previous announcements, the autumn meeting of the Iron and Steel Institute will be held at Stockholm on Friday and Saturday, Aug. 26 and 27 next. The following papers have been promised:

1. On the development of the Swedish iron industry; by Richard Akerman, Director-General of the Swedish Board of Trade, Honorary Member and Bessemer Gold Medalist.
2. On the most prominent and characteristic features of Swedish iron ore mining; by Professor C. Nordenstrom (School of Mines, Stockholm).
3. On the danger of using too hard rails; by C. P. Sandberg, M. Inst. C. E.
4. On the action of explosives on the tubes of steel guns; by Professor W. C. Roberts-Austen, C. B., D. C. L., F. R. S., Vice-President.
5. On brittleness in steel produced by annealing; by J. E. Stead, F. I. C., Member of Council (Middlesbrough).
6. On the micro-chemistry of cementation; by Professor J. O. Arnold (University College, Sheffield).
7. On the influence of metalloids on cast-iron; by Guy R. Johnson (Embsville, Tennessee, U. S. A.).

St. Louis Railway Club.

The June meeting of the club was held on the 25th on board the ferry steamer Andrew Christy, President Charles B. Adams in the chair. The paper of the day, by William H. Bryan, was on "Recent Improvements in St. Louis Ferries." The Andrew Christy, which was placed at the disposal of the club, through the courtesy of the Wiggins Ferry Co., served to bring out the points of these improvements. The steamer left the wharf at North Market St. at 3 p. m., going down the Mississippi, and the members had an opportunity to inspect the terminals on the west side of the river, the St. L. & N. W., Wabash, Wiggins Ferry, Terminal Railroad Association, Missouri Pacific & Iron Mountain. At Carondelet the boat crossed the river for the return trip and an inspection was made of the terminals at East St. Louis as follows: The Air Line, Wiggins Ferry Co., Mobile & Ohio, Illinois Central, Big Four, Louisville & Nashville, Vandalia, B. & O. S. W. C. B. & Q., Wabash, C. P. & St. L., St. L. & P. N. Manager Sands and Mr. John J. Baugh of the Wiggins Ferry Co. conducted the trip.

On motion of Mr. S. G. Scarritt the club voted to invest \$500 in United States War Bonds. The next meeting of the club will be held Sept. 9, at the National Stock Yards, East St. Louis, Ill.

Southern Railway Agents' Association.

This Association, an organization of the junction and terminal local freight agents of the Southern Railway Co., held its first meeting at Norfolk, Va., July 12 and 13. It is proposed to hold semi-annual meetings, and the next one will be held at Brunswick, Ga., in January, 1899. The President of the company is E. H. Lea, of Richmond, and the Secretary is J. C. Helner, of Knoxville.

While the objects of the Association are largely social, and much of the most profitable discussion among the members will be that which is informal and outside of the business sessions, the Norfolk meeting appears to have been conducted in a very business-like manner. There were 15 topics and each one had been previously sent to three or four agents with a request for a paper or remarks. As a result a large number of well-written articles were presented, and they will be printed in pamphlet form for distribution. The topics embrace the usual range of the duties of agents and their relations to their superiors and to the public. Among the questions were: What are the advantages of a daily forwarded report; what is the best method of filing waybills; should inward waybills be recorded on a book before the freight is unloaded and should the unloading clerk check from the book record; should the agent make a personal check of all house and bulk freight once a month; is the extension of credit a necessary adjunct to successful solicitation?

The members, many of whom were accompanied by ladies, were entertained at Norfolk and at the coast resorts in the vicinity by the Chesapeake Line, the Merchants' & Miners' Transportation Co., the Willoughby Spit Route, the Old Dominion Line, the Johnston Blue Cross Line and the Virginia Navigation Co. An address was made at the meeting by Mr. J. W. McCarrick, General Southern Agent of the Clyde Line. His subject was "The Duties of Local Agents." About 65 agents were present at the meeting. We understand that the officers of the road heartily approve the purposes of the association.

The Civil Engineers' Club of Cleveland.

At the regular meeting in July Mr. Oliver S. Hubbell, of the firm of Hubbell & Benes, delivered an address upon the subject of "Marble versus Granite." He was led to this topic by a recent study of the various marbles and granites of this country, with reference to their adoption in the construction of the Wade Memorial Chapel and Receiving Vault now building at Lake View Cemetery. The choice of material lay between white terra cotta, marble and granite. Marble was the material selected, and it was proposed to use white marble, but we soon discovered that all white marble is not white. Mr. Norcross recommended the Georgia marble and so did Mr. Tiffany. This has been used in building the State Capital at Providence, and the Corcoran Gallery, Washington. The only building we know of which is really white is the Mausoleum at Detroit. This is built of Rutland marble. South Dover and Tuckahoe marbles are used in New York City. The Lee marble is largely used in Washington and Philadelphia, but this has a bluish gray tinge. It has certain defects called "shakes," and contains some particles of magnesia, which dissolve in wet weather and leave the surface pock-marked. The Vermont marbles were examined also, in the quarries and in buildings. No old marble was found in New York City that is not more or less discolored and disintegrated. The top surfaces are both rough and dark, while the under sides of projections are in good order. The Vermont quarries are probably the largest marble quarries in the world. These are at Proctor and East Rutland. The buildings of the quarry company are built of marble taken at random without selection. They are, therefore, quite mixed in color and give a really fine architectural effect. The owners were quite surprised at our admiration of these buildings. The Rutland marble is easily cut into fine lines and ornamental figures. On the other hand, Georgia marble is hard to cut, and unless great care is used large crystals will break out in cutting.

The Building Committee advised the use of granite, but the architects desired to use marble protected, which would be more beautiful and susceptible of elegant ornamentation, and would last a long time. But Mr. Wade said he wanted a building that would last 500 years, therefore the idea of marble had to be abandoned.

Many samples of granite were sent to the architects. Granite is refractory and has to be tooled by hard and patient labor. Pneumatic tools have been invented for under cutting, but plain surfaces are generally worked by hand. Granite does not lend itself to fine ornamental lines, and its gray color prevents the best effects of light and shadow. Of all the granites the North Jay seems to have the lightest color. Grant's tomb and the new Bowling Green building, New York, are built of this. It is, however, rather porous and soft and occasionally discolored by iron. A few defective blocks may spoil the effect of an entire building. Westerly granite is the darkest of all. The Concord granite is used in the Library Building at Washington. It contains some particles of magnesia. The Troy, N. H., granite is light and sound and of good quality. The Halliwell granite was used in building the State Capitol at Albany. Barre has the most prolific quarries in America, but the product is liable to have iron in it, at least in the sap. Small specks of iron, hardly detected in the first instance, will later dissolve and streak the whole surface. However, it has been used for 25 years, and some monuments built of it are still as good as new. The Halliwell granite is the best and most expensive and is largely used for monumental work. It is homogeneous, all sections presenting the same appearance in whatever direction they are taken. It was finally decided to use either the Troy or the Barre granite in the Memorial Chapel.

PERSONAL.

—Mr. J. R. Goddard, at one time Travelling Auditor of the Chicago, Burlington & Quincy, died at Galesburg, Ill., July 11.

—Mr. Harrison Souder is Acting Superintendent of Bridges in Philadelphia since the death of Superintendent C. A. Friik.

—Mr. William M. Ross, the builder of the first locomotive cab and the first snow plow for railroads, died recently in Connecticut.

—Mr. Charles E. Fish of Cincinnati, O., has been made Chairman of the Executive Committee of the National Association of Local Freight Agents.

—Gen. John Stuart Williams, ex-United States Senator and a veteran of the Civil and Mexican wars, died at Mount Sterling, Ky., July 17. Since 1885 he has been engaged in promoting railroads in the mineral regions of Kentucky.

—Mr. James A. Roosevelt, a New York banker, died July 15. He was a director of the Buffalo, Rochester & Pittsburgh RR., the New York, Chicago & St. Louis RR., the New York Life Insurance & Trust Company, and Vice-President of the Chemical National Bank.

—Mr. James R. Hatmaker, who was the private secretary of Cornelius Vanderbilt for 15 years, has severed his connection with the New York Central and will engage in special railroad and financial business in the capacity of administration adviser and organization expert.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fe.—D. G. Farragut has been appointed Soliciting Agent with headquarters in Mexico, Mex.

Atlantic Coast Line.—The directors of the newly consolidated Atlantic Coast Line of South Carolina are: C. O. Witte, B. F. Newcomer, H. Walters, M. Jenkins, J. T. Barron and A. Hamilton. G. G. Gadsden of Charleston, S. C., was elected President.

Brockville, Westport & Sault Ste. Marie.—At the annual meeting held July 12 R. G. Murphy, Elgin, Ont., was elected a director, vice W. G. Parish, Athens, Ont. The officers are re-elected.

Canadian Pacific.—William Keating, who recently resigned as City Passenger Agent of the Grand Trunk, at Toronto, Can., has been appointed to a similar position with the C. P. at Toronto.

The Western Ontario Division will be divided on Aug. 1. The first division will consist of the main line between Toronto, Ont., and Detroit, Mich., and the St. Thomas, Ont., branches. Division Superin-

tendent Thomas Williams will have charge. He will remove his headquarters from Toronto to London, Ont. The second division will consist of the Teeswater, Owen Sound and Orangeville, Ont., branches, and will be looked after by E. A. Price, at present Chief Car Distributor and Dispatcher at Toronto. He will make Toronto his headquarters.

Chesapeake & Ohio.—It has been decided to discontinue the office of Chief Engineer, held by H. Frasier, who resigned recently. The duties will be performed by Engineers Maintenance of Way on each of the grand divisions. (June 10, page 419.)

Chicago Great Western.—N. J. Oman, Roadmaster, with headquarters at Des Moines, Ia., has had his territory extended. It now includes the roadbed between Des Moines and Kansas City.

Delaware & Hudson Canal Co.—C. E. Rettew, Master Mechanic of the Pennsylvania Division, has resigned. He is succeeded by W. R. Johnson, heretofore foreman of the locomotive shops at Carbon-dale, Pa. Mr. Rettew succeeded S. H. Dotterer as Master Mechanic 12 years ago.

Detroit & Lima Northern.—The general offices are located in Detroit after July 15. Hitherto the departments had been located in Lima, Ohio, Tecumseh, Mich., New York City and Detroit, Mich.

Detroit, Grand Rapids & Western.—Blaine Gavett, District Passenger Agent, with headquarters in Detroit, has had his territory extended to include Canada, Ohio and Western Pennsylvania.

East St. Louis Belt.—The officers of this newly incorporated company (July 8, p. 503) are: President, Julius S. Walsh; Vice-President, E. P. Bryan; Secretary and Treasurer, James Hanna. Mr. Bryan is Vice-President and General Manager of the Terminal Railroad Association of St. Louis.

Erie & Central New York.—Stewart Browne, Vice-President and Manager of the National Surety Company of New York, has been elected President, succeeding Wayland D. Tisdale, resigned.

Fall Brook.—The vacancy caused by the death of George E. Bartlett, Superintendent of Bridges on the Syracuse, Geneva & Corning Division, will not be filled. The duties of the position are undertaken by A. Williams and W. R. White, bridgemen, whose territory has been extended covering the S. & G. C. Division.

Fitchburg.—Joseph B. Russell has been elected to fill the vacancy in the Executive Committee of the Directors, caused by the death of Mr. Edward C. Thayer.

Grand Trunk.—F. W. Egan has been appointed to the office of Trainmaster at Belleville, Can., vacated by the promotion of Mr. Herbert to the position of Superintendent of the Eastern Division.

Iron.—At the annual meeting held at Ironton, Ohio, the following directors were elected: Edwin E. Floyd, Boston, Mass.; C. C. Clark, D. L. Ogg and Rolston Clark, Ironton, Ohio. The personnel of the officers of the company is unchanged.

Lake Shore & Michigan Southern.—The duties of the office of General Manager have been distributed and are largely handled by General Superintendent P. S. Blodgett.

Lehigh Valley.—H. C. Burnett has been appointed Division Freight Agent in charge of merchandise traffic on the main line and branches in New Jersey, except Phillipsburg and points east of Newark, with office at Newark, N. J. He succeeds T. J. Klase, assigned to other duties.

Little Kanawha.—The stockholders elected Capt. W. A. McCosh a director, vice A. B. White.

Maine Central.—A. J. Logan, formerly Tie Inspector, has been appointed Roadmaster on the Eastern Division, vice V. H. Foss, resigned.

Mechocan & Pacific.—E. W. Knapp has been appointed Master Mechanic in charge of the Motive Power Department, vice W. H. Rice, resigned, with headquarters at Zitacuaro, Mex.

Mobile & Birmingham.—T. E. Hartwell, formerly General Foreman, has been appointed Master Mechanic, succeeding J. J. Thomas, Jr., who resigned to accept the position of Master Mechanic of the Mobile & Ohio at Tuscaloosa, Ala.

Mobile & Ohio.—R. H. Duesberry, formerly Purchasing Agent, has been appointed Stationer. (July 8, p. 502.)

Muscogee Coal & Railway Co.—The officers of this company referred to in the Construction column are: President, J. W. McNeil; Vice-President, W. M. Spurlock, Guthrie, O. T.; Secretary, F. H. Greer; Treasurer, N. C. Guss; Chief Engineer, C. G. Horner.

New York, Wyoming & Western.—The officers of this company referred to in the Construction column are: E. B. Sturgis, President; L. A. Watres, Vice-President and General Manager; T. H. Watkins, Treasurer; Thomas E. Jones, Secretary; Edward L. Jenks, Chief Engineer.

North Carolina (Southern).—At the annual meeting of the stockholders the directors nominated by the state were re-elected, while R. F. Hoke, H. W. Fries and Hugh McRae were chosen to represent individual investors. The officers are R. M. Norment, president; H. C. Worth, Secretary; W. J. Sutton, Treasurer.

Northern Pacific.—W. S. Clarkson, Master Mechanic of the Rocky Mountain Division, with headquarters at Missoula, Mont., has been appointed Master Mechanic of the Montana & Yellowstone Division with headquarters at Livingston, Mont., to succeed Angus Brown, resigned. J. P. Barnes, General Foreman of the Brainard shops, succeeds Mr. Clarkson, and H. A. Lyddon becomes General Foreman, vice Mr. Barnes.

E. W. Osborne, formerly Chief Clerk to General Superintendent Kimberly, has been appointed Insurance Inspector.

Omaha Bridge & Terminal.—P. J. Nichols, formerly Superintendent of the Nebraska Division of the Union Pacific, has been appointed Superintendent of the O. B. & T.

Pearl & Leaf Rivers.—The officers of this company, referred to in the Construction column, are: President, James W. Oakford, Scranton, Pa.; Treasurer, C. P. Davidson, Scranton; General Manager, F. L. Peck, Scranton.

Plant System.—J. J. Purdon has been appointed Superintendent of the South Florida, or Fifth Division, vice H. A. Ford, resigned. W. P. Harris, Superintendent of the Alabama Midland, or Third Division, has resigned. No appointment has yet been made. All heads of departments report to B. Dunham as Acting Superintendent.

Pontotoc & Starkville.—The directors of this new company, referred to in the Construction column, are: N. B. Crawford, J. A. McArthur, J. B. Paden, N. W. Bradford, R. Thomas, B. F. Collins, G. W. Smith, W. A. Tabb, William Mosley and E. J. Hall. Officers have been elected as follows: President, N. B. Crawford; Vice-President, J. A. McArthur; Secretary and Treasurer, W. A. Tabb.

St. Joseph & Grand Island.—O. G. Burrows, heretofore Traveling Passenger Agent, has been appointed General Agent, with headquarters at Kansas City.

St. Louis, Peoria & Northern.—W. H. Gridley has been appointed Superintendent, with headquarters at Springfield, Ill., vice L. S. Graves, resigned. The latter's headquarters were at St. Louis, Mo.

St. Louis, St. Louis & Southern.—The officers of this company, referred to in the Construction column, are: President, H. D. Mackay, Pomona, Mo.; Vice-President, W. M. Fishback, Ft. Smith, Ark.; Chief Engineer, J. A. Meriweather, Springfield, Mo.

South Atlantic & Ohio.—John M. King has been appointed Master Mechanic of the shops at Bristol, Va. and Tenn., succeeding E. M. Roberts, resigned. (July 15, p. 521.)

Staten Island Rapid Transit.—J. Van Smith was appointed Receiver by the Supreme Court of the State of New York on July 14. Notice was given by President J. F. Emmons that all officers, agents, servants and employees were discharged midnight July 14.

Tacoma & Columbia River.—At a meeting of the stockholders held in Tacoma, Wash., July 6, E. G. Dorr, Acting Superintendent and General Freight and Passenger Agent, was elected Secretary, vice William Bailey, Jr.; F. Everhart was elected Assistant Secretary.

Union Pacific.—William C. Winter has been appointed Division Superintendent, succeeding Robert R. Sutherland, resigned, with headquarters at Omaha, Neb.

Union Pacific, Denver & Gulf.—The Union Pacific shops at Denver have been leased to the U. P., D. & G. Z. T. Sprigg, Division Master Mechanic at Denver, is looking after U. P. Co.'s interests in the machinery department. Since the transfer no car work has been done except running repairs.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—This company is making two changes in the city of Chicago on account of Sanitary District work. One of these, known as the Lemoine change, requires about one mile with a drawbridge of 368 ft.; the other, at Le-mont, is 4,200 ft. long, and will require a drawbridge of 393 ft. This work is being done by the Sanitary District and is nearly completed. (Official.)

BALTIMORE & OHIO.—Forty miles of 85-lb. 60 ft. rails are purchased and the receivers will experiment with them on the Pittsburg Division and in the Baltimore tunnel. These rails were originally bought for the Columbia & Maryland Electric Railroad, designed to parallel the B. & O. between Baltimore and Washington and to become an important business factor between those points. The project failed and the rails were bought by the B. & O. (Official.)

BLACK DIAMOND.—The successor to the proposed Ohio River, Cynthia & Tidewater should have been given as Ghent, Cynthia & Tidewater, instead of Ghent & Cynthia. It is to be 225 miles long and has a capital stock of \$56,250. Albert E. Boone of Zanesville, O., is the promoter. (July 8, p. 502.)

BRAINARD & NORTHERN MINNESOTA.—Tracklaying is to begin about Aug. 1 on the extension from Walker, Minn., northwest about 30 miles to Lake Bemijida. A. Guthrie & Co. of St. Paul, Minn., have the contract. (Jan. 11, p. 34.)

BRANDON & SOUTHWEST.—Robert Waddell of Trenton, Ont., is reported to have obtained the contract for building this line from Turtle Mountain northeast to Brandon, Man., and from Deloraine to Wakida, a total of 90 miles. The work is expected to cost \$1,000,000, and is to be completed by Nov. 1, 1904.

CANADIAN ROADS.—Arrangements have been completed, according to report, for building a railroad from Brantford, Ont., west about 100 miles to Woodstock, both on the Grand Trunk. R. L. Middleton, of the firm of McKenzie, Middleton & Stewart, will have charge of the building, and surveys are to be made at once.

CHICAGO, ROCK ISLAND & PACIFIC.—Fourteen miles of track is laid, according to report, from the Chicago, Rock Island & Texas extension from Bridgeport, Tex., west 28 miles to Jacksboro, and it is expected that the entire line will be completed early next month. (May 27, p. 382.)

CLEARFIELD SOUTHERN.—The route of this road, recently incorporated in Pennsylvania (July 15, p. 522), is from Clearfield Bridge, on the Beech Creek Railroad, to Belsena Mills, on the Pennsylvania, 15 miles. The contracts are to be let in August. A. W. Lee of Clearfield, Pa., is President, and Samuel Brugger of Flemington, Pa., Chief Engineer. (Official.)

COLORADO & NORTHWESTERN.—Work is begun, according to report, on the Eldora branch from Gold Hill, Col., near Sunset, southwest 17½ miles to Eldora. (June 24, p. 466.)

COOS BAY, ROSEBURG & EASTERN.—Grading is begun, according to report, on a spur of about 2½ miles, from the main line in Coos County, Ore., to the Klondike mine. One hundred men will be put at

work. One mile will be trestle and the rest grading.

DENVER & RIO GRANDE.—Bids are being asked, according to report, for the extension to the Ibox mines near Leadville, Col. (June 24, p. 466.)

DURHAM & CHARLOTTE.—One mile additional track is laid on this line from Gulf, N. C., southwest toward Charlotte. This makes 17½ miles of completed road and three miles more are ready for track. (Aug. 20, 1897, p. 595.)

FLINT & PERE MARQUETTE.—On Sunday, July 17, the Port Austin and Sand Beach divisions, from Port Huron, Mich., to Grindstone City, 92 miles, were changed from 3 ft. to standard without interruption of passenger train service.

FLORIDA & ALABAMA.—This company has been incorporated in Alabama with a capital stock of \$200,000 to build a line from Garland, on the Louisville & Nashville, southeast 75 miles to Geneva and thence to a point in Florida. The incorporators are: G. B. Frierson, P. J. Grant, Henry Stanley and E. C. Lewis, River Falls, Ala., and J. Hill Eakin, John S. Lewis and E. L. Moore, Nashville, Tenn.

GUADALOUPE VALLEY.—The Attorney General of Texas has approved of an amended charter whereby this road is to run from O'Connorsport to Victoria, thence to Yoakum, Gonzales, Bastrop and Austin, with a branch from Gonzales to Zeguin and thence to San Antonio. Uriah Lott of Victoria, Tex., is President and General Manager. (July 15, p. 522.)

JONESBORO, LAKE CITY & EASTERN.—The right of way is cleared and grading in progress on the extension from Lake City, Ark., east 15 miles, and tracklaying is to begin at once. The bridge over the St. Francis River at Lake City is completed. (June 3, p. 399.)

KANSAS CITY, EL DORADO & SOUTHERN.—The first 12 miles of this line from Walker, Mo., to El Dorado Springs, 15 miles, is completed. (July 8, p. 503.) There are 60 teams and 150 men at work on the grade. Marshall Rust & Co. of Walker, Mo., have the contract. The maximum grade is 1½ per cent., and the maximum curvature 2 deg. The line requires one steel span of 100 ft. and two trestles. Surveys have been made north from Walker and south from El Dorado Springs, but there is no prospect of extending this year. F. H. Peters of Walker, Mo., is Chief Engineer. The line is being built by the Middle States Construction Co., B. A. Aldrich, Secretary and Treasurer, 900 Rialto Building, St. Louis, Mo.

LAS VEGAS, MORA & TAOS.—Operations are suspended on this projected line in New Mexico from Las Vegas, northwest 85 miles, via Mora, to Taos. (Jan. 28, p. 70.) The company expects to resume work again as soon as possible. F. A. Manzanares of East Las Vegas, N. Mex., is President. (Official.)

MEXICAN SOUTHERN.—Press reports say that James R. Progue, Civil Engineer of Oaxaca, Mex., is authority for the statement that work is soon to begin on an extension of the Mexican Southern southeast from Oaxaca through the state of Oaxaca. This is probably the extension which has been under consideration for some time to Tehuantepec on the National Tehuantepec.

MINNESOTA, IOWA & GULF.—This company was incorporated in Iowa June 27 with a capital stock of \$10,000 to build a line from New Ulm, Minn., to Conception, Mo. The incorporators are: J. J. Bell, A. C. Titus, Samuel Compton, Frank T. Campbell and J. H. Dixon, all of Des Moines, Ia.

MUSCOGEE COAL & RAILWAY CO.—Contracts are to be let in October for the extension of this line, which is projected to run from Red Fork, I. T., through the Cherokee and Creek Nation Reservations to Guthrie, O. T., about 100 miles. (Feb. 18, p. 130.) About 12 miles of the road is completed. The officers are given under Elections and Appointments. (Official.)

NEW YORK & PENNSYLVANIA.—It is probable, though not definitely decided, that this company will build about six miles of new road this year from Oswayo to Milford, Pa. (Official.) The stockholders decided to increase the bonded indebtedness for this purpose last October. (Nov. 5, 1897, p. 791.)

NEW YORK, WYOMING & WESTERN.—The projectors are reported to have determined upon the route of this line from Scranton, Pa., east to the seaboard. From Scranton, where it will connect with the Wyoming, Wilkesbarre and Lackawanna coal fields, the line will run to Belvidere, N. J., where connection will be made with the Lehigh & Hudson, crossing the state of New Jersey to the Poughkeepsie bridge for New England connections. E. B. Sturges of Scranton, Pa., is President. (May 27, p. 383.)

NORFOLK & SOUTHERN.—Surveys are completed for the branch (March 11, p. 188), from Snowden, N. C., southeast along Currituck Sound to Powell's Point, but building is deferred until after the war. (Official.)

NORTHERN PACIFIC.—The Secretary of State of Montana on July 15 received a resolution from the Board of Directors of the Northern Pacific authorizing the extension of the Rocky Fork Branch from Rockvale in Carbon County, Mont., to the Bridges coal field near the southern line of the state.

The company has made various exploring surveys from Pullman, Wash., toward Snake River, but has at present no intention of building a new line. (June 24, p. 467.)

A letter from this company states that the reported work along the Columbia River, from Vancouver, Wash., south to Kalama, is not being done by this company, and that no such extension is contemplated. (July 8, p. 503.)

NORTHWEST.—President Isaac E. Blake, of 11 Broadway, New York, has given orders to Carlos Gillespie, of Huntington, Ore., Chief Engineer, to let a contract at once for building the first three miles from Huntington down the Snake River. (June 10, p. 421.)

PEARL & LEAF RIVERS.—Survey is completed and building in progress on this line from Hattiesburg, Miss., southeast 41 miles via Altman, Advance, Sumral and Improve to Columbia on Pearl River in Marion County. (Jan. 21, p. 50.) Building is under the supervision of the company and no contracts

have been let. About 13 miles, including lateral roads, is completed. It runs partially through a rolling country with easy grades and curves. There is one important trestle, but no iron or steel bridges. In operating the 13 miles, the company employs two locomotives and 25 cars belonging to the road. It is expected to build five miles more before next September. The officers are given under Elections and Appointments. (Official.)

PONTOTOC & STARKVILLE.—The route of this proposed line is from Pontotoc, Miss., south about 60 miles via Houston to Starkville. It is organized under the laws of Mississippi with a capital stock of \$100,000. This is practically an extension of the Gulf & Chicago. The directors and officers are given under Elections & Appointments. (July 8, p. 503.)

PRESCOTT & EASTERN.—Tracklaying is reported begun on this line from a point near Prescott, Ariz., on the Santa Fe, Prescott & Phoenix, south 26.4 miles to Mayers. F. M. Murphy of Prescott, is President. (April 8, p. 266.)

RICHMOND, PETERSBURGH & CAROLINA.—Negotiations are in progress for the extension of this line from Ridgeway, N. C., to Wilson through the counties of Halifax, Northampton, Warren, Franklin, Nash and Wilson. There connection would be made with the new road from Rocky Mount, in Nash County, via Nashville to Springhope and thence eventually to Raleigh. The section from Petersburg to Ridgeway is nearly completed. (July 8, p. 513.)

ST. JOSEPH & GRAND ISLAND.—The arrangement with the Atchison, Topeka & Santa Fe and the Kansas City & Northern connecting line whereby this company obtains trackage rights into Kansas City, Mo., (July 15, p. 523), provides for the building of a line from Gower to Trimble, Mo., but train service will begin Aug. 1, trains running via Plattsburg, Mo. (Official.)

ST. LOUIS, PEORIA & NORTHERN.—The report that this company is to join with the Chicago, Rock Island & Pacific and the Rock Island & Peoria in an extension to St. Paul and Minneapolis (July 8, p. 503), is officially declared to be untrue.

ST. LOUIS, SILOAM & SOUTHERN.—The route of this proposed line is from St. Louis, Mo., southwest through the counties of St. Louis, Franklin, Jefferson, Washington, Crawford, Iron, Dent, Reynolds, Shannon, Texas, Howell, Douglass and Ozark in Missouri, and the counties of Marion, Boone, Newton, Madison, Franklin, Crawford and Sebastian in the State of Arkansas to Ft. Smith, about 300 miles. Its only intersection with other roads is at Pomona with the Kansas City, Fort Scott & Memphis. Three preliminary surveys have been made, and the final survey and location is now being completed. The contract for grading, tracklaying and bridging has been let to the International Construction and Improvement Co., of Pomona. Grading is to begin in force during this month at Pomona. The work is not difficult, and only two bridges of importance are required, one at the crossing of the White River, in Arkansas, and the other over the Arkansas River, near Fort Smith. The officers are given under Elections and Appointments. (Official.)

SAN ANTONIO, LLANO & NORTHERN.—George W. Angle, General Manager of this road at Austin, Tex., announces that the surveys are completed from Strawn to Llano, 140 miles. The road as projected is to run from San Antonio through Strawn and Llano to Thurber, on the Texas & Pacific. (Feb. 4, p. 88.)

SEABOARD AIR LINE.—Grading is reported about completed on the Logansville & Lawrenceville extension from Logansville, Ga., northwest 10½ miles to Lawrenceville. (June 3, p. 399.)

SOUTHERN.—Tracklaying is completed from Mocksville, N. C., to within one mile of Mooresville, on the North Carolina Midland extension of 27.4 miles. The new road will be used principally by the fast and other freight trains, most of the passenger trains being run by way of Greensboro. (June 24, p. 467.)

The track is reported laid on the four miles of extension from near Leeds, Ala., to the ore mines of the Sloss Iron & Steel Co. (April 29, p. 317.)

TERRE HAUTE & INDIANAPOLIS.—Judge Woods, of the United States Court, at Indianapolis, has given Receiver Mallott permission to extend the Hadleytown Branch somewhat less than two miles to a new line. The work will be done by the company's forces. (Official.)

TEXARKANA & SHREVEPORT.—This company has built five miles of road this year, completing its track to Wallace, La.

WABASH.—At the annual meeting of the stockholders to be held at St. Louis Sept. 13, the following propositions will be submitted: First, whether the Wabash will build a railroad from East Hannibal, Ill., north to Quincy, 15 miles, or buy or lease a railroad wholly or partially built between these points; second, whether the company will build or aid in building a railroad from Moulton, Ia., north about 27 miles to Albia, or whether the company will buy or lease a railroad wholly or partially built between these points.

Electric Railroad Construction.

BOSTON, MASS.—A franchise has been granted to the West Roxbury & Roslindale St. Ry. Co. to lay tracks in Dedham for a distance of about one mile.

BOUND BROOK, N. J.—The New York & Philadelphia Traction Co. is now running cars on five miles of its road, between Bound Brook and Somerville. In a few days the work of connecting the line from Bound Brook with that of the Brunswick Co., one mile east of the town, will be completed, and this will make a through route from the county seat of Somerset, to the county seat of Middlesex, running through a section not heretofore directly reached by rail. The company is also at work on its line from Bound Brook to Dunellen, which, in connection with the proposed line through Union County from Elizabeth to Plainfield, will make a through route from Newark to Bound Brook. Work is now in progress which will complete the line through Somerset and Mercer Counties to Princeton and Trenton.

DENVER, COL.—The Denver Consolidated Tramway Co. is to relay its tracks on Broadway with heavier steel.

EAST ST. LOUIS, ILL.—The East St. Louis & Col-

insville Electric RR. Co. was recently incorporated with a capital stock of \$2,500; incorporators, William Ortgrier, T. T. Ramey and W. E. Hadley.

LOS ANGELES, CAL.—The Los Angeles Terminal Ry. Co. was given a franchise to build an electric road in the city of Pasadena. (Mar. 25, p. 225.)

The San Gabriel Traction Co. has applied to the city of Pasadena for a franchise.

LYNCHBURG, VA.—The Lynchburg Electric & Light Co., which recently got control of the Lynchburg St. Ry., will make improvements in the plant and build some extensions in the suburbs.

LYNN, MASS.—The Lynn Board of Aldermen has given permission to the Lynn & Boston R. R. to lay tracks on Essex street, from Market to Johnson, and on New Washington street, from Broad street to the Nahant line.

NEWTOWN, PA.—The Newtown Electric Ry. Co., now building in Newtown, proposes to extend its route to Doylestown. The officers of the company are T. P. Chambers, President; Geo. C. Worstall, Secretary; A. Chambers, Treasurer.

PHILADELPHIA, PA.—A meeting of stockholders of the Philadelphia & Westchester Traction Co. will be held Aug. 23 to authorize an issue of \$340,000 in bonds to cover cost of building the proposed extension of about 10 miles from Newtown Square to Westchester.

PITTSBURGH, PA.—The McKees Rocks & Neville Island St. Ry. Co. was granted a charter July 5. The company will build a line 1¼ miles long in Allegheny county, connecting points named. The directors are: W. J. Burns, T. S. Bigelow, J. D. Callery, W. J. Burns, Jr. John C. Reilly, President, Pittsburgh, Pa. Capital stock, \$15,000.

PLYMOUTH, MASS.—The Directors of the Plymouth & Sandwich Ry. Co., at a meeting held July 16, voted to advertise for bids, to be opened July 28, for building six miles of the road from Hotel Pilgrim, in Plymouth, to Fresh Pond. Bids are to be in two forms—for work and for work and all materials except rolling stock, and should be addressed to D. E. Damon, Attorney for the company, Plymouth. Plans and specifications are to be seen at the office of Hariman Bros., 3 Somerset street, Boston. Horace B. Taylor, Boston, is President, and Wm. H. Brine, Somerville, Mass., is Treasurer of the company. (Nov. 26, 1897, p. 841, June 10, 1898, p. 421.)

PORT CARBON, PA.—The Port Carbon & Middleport Electric Ry. Co. has been incorporated with a capital stock of \$100,000 to build an electric road from Middleport to Port Carbon, about seven miles. Among the incorporators are J. A. Pattee, R. S. Martin and C. S. Jarvis.

READING, PA.—Surveys are completed and grading will be begun at once on the line of the Reading & Royertown Electric St. Ry. Jeremiah Hagenman, President; M. G. Taylor, Treasurer. (Mar. 12, 1897, p. 195.)

GENERAL RAILROAD NEWS.

Railroad Earnings.

Showing the gross and net earnings for the periods ending at the dates named:

May 31:	1898.	1897.	Inc. or Dec.
Central Pacific.			
1 month.....	Gross \$1,474,335	\$1,044,817	I. \$429,518
1 ".....	Net 624,340	410,620	I. 213,720
5 months.....	Gross 6,062,410	4,728,357	I. 334,053
5 ".....	Net 2,300,456	1,641,832	I. 658,624
Chicago & Grand Trunk.			
1 month.....	Gross \$300,167	\$226,866	I. \$73,301
1 ".....	Net 124,159	99,889	I. 24,270
5 months.....	Gross 1,542,761	1,190,880	I. 351,881
5 ".....	Net 317,526	137,203	I. 180,323
Grand Trunk of Canada.			
1 month.....	Gross \$1,571,581	\$1,475,578	I. \$96,003
1 ".....	Net 609,240	552,106	I. 57,134
5 months.....	Gross 7,596,461	6,947,319	I. 649,142
5 ".....	Net 2,361,464	1,921,834	I. 439,630
Kansas City, Fort Scott & Memphis.			
1 month.....	Gross \$398,928	\$381,282	I. \$17,646
1 ".....	Net 121,423	115,742	I. 5,681
11 months.....	Gross 4,717,797	4,248,410	I. 469,387
11 ".....	Net 1,476,209	1,352,755	I. 123,454
Lake Erie & Western.			
1 month.....	Gross \$288,854	\$278,383	I. \$10,471
1 ".....	Net 101,735	91,985	I. 9,750
5 months.....	Gross 1,396,613	1,342,569	I. 54,044
5 ".....	Net 541,034	526,049	I. 14,985
Missouri, Kansas & Texas.			
1 month.....	Gross \$767,068	.....	.....
1 ".....	Net 187,784	.....	.....
11 months.....	Gross 11,381,616	.....	.....
11 ".....	Net 3,743,939	.....	.....
Philadelphia & Erie.			
1 month.....	Gross \$391,611	\$354,718	I. \$36,893
1 ".....	Net 121,073	95,385	I. 25,688
5 months.....	Gross 1,515,084	1,490,552	I. 24,532
5 ".....	Net 357,860	383,112	D. 25,252

June 30:	1898.	1897.	Inc. or Dec.
Nashville, Chattanooga & St. Louis.			
1 month.....	Gross \$422,286	\$463,241	D. \$40,955
1 ".....	Net 157,635	179,900	D. 22,265
12 months.....	Gross 5,646,549	5,116,118	I. 530,431
12 ".....	Net 1,982,724	1,911,447	I. 71,277
New York Central & Hudson River.			
1 month.....	Gross \$3,625,400	\$3,894,713	D. \$269,313
6 months.....	Gross 22,172,423	21,341,676	I. 830,747
Pittsburgh, Cincinnati, Chicago & St. Louis.			
1 month.....	Gross \$1,176,630	\$1,188,593	D. \$11,963
1 ".....	Net 224,369	438,800	D. 214,430
6 months.....	Gross 7,559,284	6,789,697	I. 769,587
6 ".....	Net 1,650,834	1,760,612	D. 109,778

ALTAMONT & MANCHESTER.—The Louisville & Nashville is reported to have bought this line, which extends from Altamont, Ky., to Luceil, 3.5 miles. It was chartered in 1890 to run from Altamont to Manchester, Ky., 26 miles, and completed as above in 1894.

ATCHISON, TOPEKA & SANTA FE.—This company has sold to a syndicate composed of the Guaranty Trust Co., Kuhn, Loeb & Co. and Speyer & Co. of New York, \$3,500,000 general mortgage bonds. The proceeds are to be used for cash expenditures

on improvements heretofore made on the Santa Fe Pacific and other lines and to complete the purchase of the Atlantic & Pacific. This is in continuation of the arrangement made with the same syndicate last February for the conversion of the 6 p. c. guarantee fund notes into new 4 p. c. general mortgage bonds due 1895. (Feb. 11, p. 111.)

ATLANTIC COAST LINE.—At the meeting previously announced (July 1, p. 486) at Florence, S. C., on July 15, the various corporations of the Atlantic Coast Line in South Carolina voted to consolidate as one corporation under the name of the Atlantic Coast Line of South Carolina. On July 16, at a meeting of the new company, officers and directors were elected, as given under Elections and Appointments.

BALTIMORE & OHIO.—The reorganization managers, Speyer & Co., Kuhn, Loeb & Co. and Speyer Bros., give notice that holders of various bonds and stocks must deposit the same prior to Aug. 1, after which they will be received only upon such terms as the reorganizers may impose. Holders of more than 75 p. c. of the consolidated mortgage 5 p. c. bonds of 1887, and of more than 60 p. c. of the Parkersburg Branch bonds of 1919 have deposited them with the committee, and holders of the other bonds are given until July 28 to make their deposits. The reorganization managers have called for the payment on or before Aug. 1 of the first installment of 25 p. c. on the stock assessment, which is \$2 per share on the first preferred and \$20 on the second preferred and common stock. (July 8, p. 504.)

Receipts and disbursements for May were as follows:

Receipts—	
Balance on hand April 30.....	\$1,774,237.56
Traffic items.....	3,102,255.91
Miscellaneous items.....	162,148.56
Total.....	\$5,038,641.16
Disbursements—	
Traffic items.....	\$820,124.06
Miscellaneous items.....	2,610,830.56
Total.....	3,430,954.61
Balance, May 31.....	\$1,607,686.55

The net balances May 31, on receivers' certificates, were: Series No. 1, \$10,062; Series No. 2 (Maryland Construction Co.), \$1,966; Series No. 3, \$226,431. Balance on terminal improvement fund May 31, \$263,723.

The Supreme Court of the State of New York on July 14 appointed J. Van Smith Receiver of the Staten Island Rapid Transit. He took possession the same date. The S. I. R. T. is operated by the B. & O., which owns a majority of the stock and guarantees the second mortgage bonds. It runs from Elizabeth, N. J., to South Beach, N. Y., 23.72 miles, and leases the Staten Island Ry. from Clifton, N. Y., to Tottenville, 12.82 miles.

BUFFALO & SUSQUEHANNA.—Holders of first mortgage 5 per cent. gold bonds are notified that \$79,450 has been set aside to buy these bonds at a price not to exceed par with accrued interest. Bids must be addressed care of Harvey Fisk & Sons, New York, up to July 29.

CHICAGO & ATCHISON BRIDGE.—The Receiver's accounts have been closed and the title to this bridge now stands in the reorganization committee. The Chicago & Eastern Bridge, recently incorporated in Kansas as the successor (July 1, p. 486), will shortly take possession of the property.

CHICAGO, PEORIA & ST. LOUIS.—Judge Allen, in the United States Circuit Court, at Springfield, July 9, on application of the Mercantile Trust Co. of New York, and Lewis Fitzgerald, trustees for the Reorganization Committee, appointed Samuel P. Wheeler of Springfield, and Charles E. Kimball of New York, receivers. This is in line with the reorganization plans. (July 15, p. 523.)

COLUMBUS, SANDUSKY & HOCKING.—W. L. Trenholm, President, announces that a large proportion of the holders of the general mortgage bonds and other securities issued by this company are dissatisfied with the plan of reorganization and have signed an agreement to deposit their bonds with the North American Trust Co., 100 Broadway, New York, with a view to reorganization on the following terms:

First mortgage bonds, 4 per cent., to be authorized by the reorganized company, shall not exceed \$4,000,000. Second mortgage income 4 per cent. bonds not to exceed \$1,500,000. Assessment on bonds deposited: Present first mortgage bonds, none. Present general mortgage bonds, 10 per cent. Present income bonds, 10 per cent. Present stock, 5 per cent. All assessments to be repaid in new first mortgage bonds at 80.

In the event a reorganization shall not be effected on this basis or on terms equally advantageous, then the securities to be redelivered to the subscribers on the payment of \$1 per bond.

Whatever plan of reorganization said Trust Company may effect, to be underwritten by responsible parties, and to be made effective at the earliest practicable date.

Other holders of securities issued by the Columbus, Sandusky and Hocking Railroad Company, including holders of trust certificates who wish to become parties to this agreement, are invited to call at the office of the North American Trust Company, 100 Broadway, where further information will be given. (July 1, p. 486.)

DENVER & RIO GRANDE.—Kuhn, Loeb & Co. and Speyer & Co., of New York, have made arrangements for refunding the \$6,302,500 first mortgage 7 per cent. bonds maturing Nov. 1, 1900, into a like issue of 4½ per cent. bonds. The basis is as follows: For each \$1,000 7 per cent. bond with Nov. 1, 1898, coupon attached the holder would receive a like amount of the new bonds with interest from July 1, together with a cash payment of \$59.33. The price of the new bonds is 103 per cent., and the old bonds are exchanged on the basis of 3½ per cent., interest to maturity. Holders of first mortgage bonds if desiring to avail themselves of the conversion are requested to surrender them to the United States Trust Co. of New York.

GALVESTON, LA PORTE & HOUSTON.—L. J. Smith and the Beaumont Lumber Co., in the Federal Court at Galveston, Tex., July 11, entered a petition objecting to the recent sale of this line. The road was sold at Galveston July 6 to George C. Holt, of Woodstock, Conn., for \$400,000. The objection is that the petitioners have claims against the road approved by the court to the amount of \$130,000, and that these, with other obligations, cannot be met by the proceeds of the sale. (July 15, p. 523.)

COSHOCKTON & SOUTHERN.—Judge Taft of the United States Circuit Court at Columbus, O., on July 15 appointed John W. Wardwell Receiver of this company. Mr. Wardwell is also Receiver of the Cleveland, Canton & Southern, which, in 1892, absorbed the Coshocton & Southern. The court stated that inasmuch as the road is considered unsafe, its operation must be discontinued at midnight, July 16. Permission is given to ask the court for authority to issue certificates to place the road in good condition. The Receiver is given the right to take a decree of sale within 30 days, the upset price to be \$100,000. The C. & S. extends from Coshocton, O., to Zanesville, 29.47 miles.

ILLINOIS CENTRAL.—On June 30 the I. C. surrendered the lease of that part of the Yazoo & Mississippi Valley generally known as the Yazoo Branch, extending from Jackson, Miss., to Parsons, with a spur from Tchula, Miss., east to Durant, in all about 140 miles. This branch was built by the Y. & M. V. and leased in 1888 to the I. C. The Y. & M. V. is building an extension from this branch near Greenwood northwest to connect with the I. C. portion of the Y. & M. V. at Philipp.

LEWISTON & AUBURN.—The foreclosure sale of this road is advertised for Aug. 8 at Lewiston, Me., under the consolidated mortgage for \$350,000, the interest on which went to default Oct. 1, 1897. The sale will be subject to \$85,000 first mortgage bonds of 1891. The L. & A. extends from Lewiston Junction, Me., to Lewiston, 5.41 miles. It is leased to the Grand Trunk from March 10, 1874, and is operated in connection with the Atlantic & St. Lawrence.

LITTLE FALLS & DOLGEVILLE.—On account of the failure of the firm of Alfred Dolge & Sons, whose indebtedness to the railroad company for freights, etc., was over \$8,000, the L. F. & D. was unable to pay the interest due July 1 on its \$250,000 first mortgage 6 p. c. bonds. The railroad has a second mortgage for \$100,000.

LITTLE ROCK & MEMPHIS.—At the foreclosure sale of the L. R. & M., set for Oct. 25, it is proposed to acquire the road in the interest of the Choctaw, Oklahoma & Gulf. The road will be reorganized as the Choctaw & Memphis, with a capitalization of \$1,750,000 each of preferred and common stock and an authorized bond issue at the rate of \$12,500 a mile. The eastern terminus of the Choctaw Road will be extended 130 miles to Little Rock, giving that company a through line to Memphis.—The Commercial & Financial Chronicle.

NEW ENGLAND.—A circular has been issued to the stockholders offering them the privilege of exchange of their stocks for New York, New Haven & Hartford shares on the basis previously offered of five shares of New England common or two shares New England preferred for one share of N. Y., N. H. & H. A cash bonus of \$4.50 is made on all exchanges of preferred stock prior to Jan. 1, 1899. (July 8, p. 504.)

NORTHERN CENTRAL (P. RR.).—The objection of the state of Maryland to receive \$1,500,000 in lieu of the annuity of \$90,000 has brought the question into the courts, and meanwhile the railroad company will pay the quarterly installments of \$22,500 as heretofore. (June 10, p. 422.)

NORTHERN PACIFIC.—Holders of general first mortgage bonds, due 1928, are notified that 1,928 of these bonds have been drawn for the sinking fund to be redeemed at 110 and accrued interest on presentation at the office of the Central Trust Co., New York.

PHILADELPHIA & READING.—Holders of 10-year sinking fund 5 p. c. bonds of 1902 are notified that 31 have been drawn for payment Aug. 1 at the office of the Philadelphia Co. for Insurances on Lives & Granting Annuities at Philadelphia. (Jan. 28, p. 72.)

PITTSBURGH & WESTERN.—Messrs. John T. Terry, Dumont Clark, Francis S. Smithers, James W. Alexander and Simon Borg, with Alvin W. Krech, 120 Broadway, New York, as Secretary, have agreed to act as a committee in the interest of holders of the second mortgage 5 p. c. bonds of May 21, 1891. They ask that deposits of these bonds be made with the Mercantile Trust Co., New York, on or before July 30. (June 24, p. 468.)

RICHMOND, NICHOLASVILLE, IRVINE & BEATTYVILLE.—Adolph Segal of Philadelphia, who bought this road at foreclosure sale in 1897 for \$250,000, has failed to make more than the first payment of \$25,000, and Judge Barr of the United States Circuit Court at Louisville, Ky., has ordered the property to be sold again. The failure of Mr. Segal was due to the default of the Philadelphia Guarantee Co. The line extends from Versailles, Ky., to Irvine, 60.7 miles. The new company, incorporated in December, to take over the road, is the Louisville & Southeastern. (April 29, p. 313.)

RUTLAND.—The new 4½ p. c. bonds to redeem the \$1,230,900 second mortgage 5 p. c. 20-year bonds which fall due Aug. 1 were ready for distribution July 20 at the Globe National Bank, Boston, the Clement National Bank, Rutland, or the United States Trust Co., New York. After Aug. 1 depositors of the old bonds will receive the new consols with the interest balance of \$21.25 due on each \$1,000 bond. The old bonds not exchanged will be paid when due at the Globe National Bank, Boston. (June 17, p. 446.)

ST. CROIX & PENOBSCOT.—The foreclosure sale of the Calais & Baring under the mortgage of 1852 is advertised at Calais, Me., for Aug. 1. The C. & B., extending from Calais, Me., to Baring, five miles, was reincorporated as the St. Croix & Penobscot in 1870, and the line extended to Princeton, Me., 21 miles. The controlling interest in the St. C. & P. was recently bought by the new Washington County line. (June 10, p. 422.)

UNION PACIFIC.—Mark H. Dunnell, Special Master, announces the public sale of the property covered by the consolidated mortgage of the Omaha & Republican Valley at Lincoln, Neb., Aug. 13, at 2 p. m. The line embraces 269.52 miles and went into the hands of receivers with the Union Pacific Oct. 13, 1893. By the terms of the sale bidders must deposit \$30,000 in cash, and the successful bidder must pay at least 15 per cent. of the accepted bid within ten days. The upset price is \$750,000. (July 1, p. 486.)

UNION PACIFIC, CENTRAL BRANCH.—The Missouri Pacific has bought from the reorganization committee the capital stock of the Central Branch of the Union Pacific, formerly the Atchison & Pike's Peak, which runs from Atchison, Kan., west 100 miles to Waterville. Under the old organization, this company leased the Atchison, Colorado & Pacific, and the Atchison, Jewell County & Western, all of which have been operated in recent years by the Missouri Pacific, and it is understood that this arrangement is to be continued. (July 15, p. 523.)

WHEELING & LAKE ERIE.—Foreclosure proceedings were entered in the United States Circuit Court at Cleveland, O., July 13, by the Central Trust Co. of New York, on the \$8,000,000 consolidated mortgage of 1892. This is in accordance with the plan of the reorganization committee. (June 10, July 1, pp. 422 and 486.)

Electric Railroad News.

AKRON, O.—The Akron St. Ry. & Illuminating Co. has had an ordinance introduced extending its franchises for 25 years.

BLOOMINGTON, ILL.—The Bloomington & Normal Ry., which bought the property of the Bloomington City Ry. at foreclosure sale, is composed as follows: A. E. Demange, Bloomington, President; John Graham, Wilkesbarre, Pa., Vice-President; Willis E. Gray, Secretary; J. F. Evans, Treasurer; John Eddy, General Manager; E. W. Biddle, Carlisle, Pa., and George McIntosh, Bloomington, Ill. The road will be relaid with heavy steel, new cars will be bought and the plant put in first-class condition. The old corporation, the Bloomington City Ry., still exists, but without any assets or property.

BROOKLYN, N. Y.—By order of the Directors of the Kings County Traction Co. 39,987 shares of the stock of the Atlantic Avenue RR. Co. in Brooklyn, were sold at public auction July 14. This sale also included options on 13 additional shares of the Atlantic Avenue stock and an option on nine shares of the stock of the Brooklyn, Bath & West End RR. The securities offered were bought in for \$2,100,000 by E. H. Harriman, representing a syndicate that is conducting the consolidation with the Nassau Electric RR. (Mar. 25, April 15, 22; pp. 226, 286, 302.)

CHICAGO, ILL.—The reorganization committee of the Metropolitan West Side Elevated RR., of which Mr. Frederick Olcott is chairman, has issued under date of June 29 a plan of reorganization which provides for an assessment of 4 per cent. on the \$15,000,000 stock, for which assessment new bonds at par will be delivered, the stock to be then exchangeable for 50 per cent. in new stock; also for the exchange of the \$15,000,000 first 5s for 60 per cent. in new first 4s and 53 1-3 per cent. in new preferred stock. The latter to have exclusive voting power under certain conditions for five years. The disposition of the new securities to be issued will be as follows:

First mortgage 4 per cent. gold bonds—	
For \$15,000,000 existing first mortgage bonds, 60 per cent. in new bonds.....	\$9,000,000
To be subscribed for at par by holders of existing stock	600,000
Reserve for new company's treasury.....	400,000
Total	\$10,000,000
Five per cent. non-cumulative preferred stock—	
For \$15,000,000 existing first mortgage bonds, 53½ per cent. in new preferred stock.....	\$8,000,000
For obligations and floating debt of old company	\$35,000
Reserve for reorganization purposes, any balance to go to new company.....	165,000
Total	\$9,000,000
Common stock—	
For \$15,000,000 old stock, 50 per cent.....	\$7,500,000

Summarized, the rights of the present security holders under this plan will be as follows:

	New first mortgage bonds.	New pfd. stock.	New common.
Bonds	60%	53 1-3%	....
Stock (on payment of 4 per cent. assessment)	4%	.....	50%

It is announced that a syndicate will be formed to underwrite the cash requirements of the reorganization. The assessment is to yield \$600,000; earnings in receiver's hands Aug. 1, 1898, \$105,000; total, \$705,000. This sum is applicable as follows:

For improvements, equipment, power-house, etc., required immediately (in addition to amount expended by receiver)	\$538,000
Estimated expenses of reorganization, including organization of new company and issue of its securities and general expenditures covering contingencies. Any balance to go to new company	167,000
Total	\$705,000

The Central Trust Co., of New York, is named as the trustee, although deposits of stocks and bonds may also be made with the Illinois Trust & Savings Bank of Chicago and the American Loan & Trust Co., of Boston. Under the agreement the committee is to have the power to determine whether or not the plan and agreement have been assented to by a sufficient number of security holders, and to declare when the same shall become binding and effective. The period during which stocks and bonds may be deposited by holders wishing to participate in the reorganization has been extended to Aug. 5, 1898.

DALLAS, TEX.—The Dallas Consolidated & Electric St. Ry. has made a mortgage with the Union Trust Co. to cover \$800,000 worth of bonds.

FORT WAYNE, IND.—Judge O'Rourke, of the Circuit Court, declares invalid \$606,000 5 per cent. bonds of the Fort Wayne Consolidated St. Ry. Co., issued by the late John H. Shipperd, of Cleveland, as President of the company, and which were intended to take up a prior issue of 6 per cent. bonds of the company, and declares these bonds were fraudulently diverted from their purpose. An issue of \$300,000 betterment bonds of the company, placed with the Guardian Trust Company, of Cleveland, is placed under the ban by the Court, and the diversion of certain of the securities to the personal account of Shipperd is declared to be fraudulent. Bonds held by Thouron & Co., Charles A. E. Brinley and William A. Houston, of Philadelphia, and by A. L. Sweetzer, of Boston, are held by the Court to be valid. The decision places Frank D. Haas

Robinson, of Cleveland, in possession of the property hypothecated by Shipperd. A commissioner is to be appointed and the property sold to pay indebtedness.

NEW YORK, N. Y.—A meeting of the stockholders of the Metropolitan St. Ry. Co. will be held Aug. 9 to vote on the proposition to increase the capital stock from \$30,000,000 to \$45,000,000. It was announced in May that the increase would be \$10,000,000, but the amount is raised to \$15,000,000. (June 24, p. 468.)

OAKLAND, CAL.—Local press reports state that the sale of the Highland Park & Fruitvale RR., which has been pending for the past year, to satisfy a mortgage of \$233,815, will take place July 25. The California Safe Deposit & Trust Co. is the plaintiff.

PHILADELPHIA, PA.—The Union Traction Co.'s earnings for the year ending June 30 are reported as follows:

	1898.	1897.		
Gross earnings	\$10,971,428	\$10,450,646	I.	\$490,792
Operating expenses	4,456,375	4,949,850	D.	493,475
Net earnings	\$6,515,052	\$5,530,796	I.	\$984,267
Fixed charges and taxes	6,490,442	6,382,730	I.	107,711
Deficit		\$851,955		
Surplus	\$24,621			
Increase as compared with 1897			I.	\$876,555

ROCKFORD, ILL.—The Rockford Ry., Light & Power Co., recently incorporated with a capital of \$250,000, was formed to acquire the property and franchises of the Rockford City St. Ry. Co. and the Rockford Traction Co. An ordinance was recently introduced in the city council to extend the companies' franchises.

WAKEFIELD, MASS.—The Mystic Valley St. Ry. Co. has applied to the railroad commissioners for authority to consolidate with the Arlington & Winchester St. Ry. Co., and to issue \$50,000 in stock. These lines are continuous, forming a junction at Winchester.

TRAFFIC.

Traffic Notes.

The Ward Line steamers have resumed their trips between New York and Santiago de Cuba.

The number of bicycles handled at the Boston & Maine station at Boston daily is said to be about 800.

The district and city passenger agents at New Orleans have formed an association with Mr. D. B. Morey Chairman.

The Merchants' Association of New York has secured a concession in round trip rates to New York from points southwest of St. Louis.

The railroads centering in Des Moines, Ia., have made a local agreement to maintain rates and refrain from giving passes to influence business.

The New Haven line steamers have resumed their regular trips, leaving New York at midnight. This schedule has been suspended since the beginning of the war on account of the restrictions placed on navigation in the harbor in the night.

The presidents of the roads west of Chicago have been holding numerous conferences the past two weeks, and have now settled many of the points of difference between their traffic officers. As a result, the outlook for a better maintenance of rates in southwestern and Colorado territory is much more promising.

On the occasion of the Baptist Young People's Union convention, held at Buffalo last week, about 10,000 passengers came over the railroads to that city. The Buffalo Commercial says that 10 new ticket brokers' offices were opened on Exchange street in that city July 14. Buffalo would seem to be a promising field for the officers of the law to explore.

The Southern Pacific and the Mallory Steamship lines are resuming business between New York and Gulf ports, and on Aug. 1 a new freight tariff will go into effect, under which the rates are made on the basis of \$1.55 per 100 lbs. (first-class) New York to Galveston. The Lone Star Line, which cut rates so severely last year, is now out of the field, its vessels having been sold to the Government.

There has been no material change in the rate situation in Joint Traffic Association territory. It is said that a very unsatisfactory state of affairs exists in respect to both freight and passenger traffic. The West Shore and the Lehigh Valley are selling tickets to St. Paul and beyond at very low rates to meet the competition of the Canadian Pacific. The rebate plan is employed, and the net rate, New York to St. Paul, is \$28.50.

No progress whatever has been made in the attempt to adjust the Canadian Pacific controversy. It is said that the Canadian Pacific is apprehensive that the testimony to be taken by the Interstate Commerce Commission at the hearing in Chicago will be made use of in Congress next winter to support legislation hostile to the Canadian road, and for this reason may propose a compromise. There are no indications of this yet, however.

The Interstate Commerce Commission has appointed a hearing at Chicago Aug. 1 on the passenger rate war to the North Pacific Coast. All the principal western, northwestern and transcontinental railroads have been summoned to appear, also the Boston & Albany, the Fitchburg, the Toronto, Hamilton & Buffalo, the Grand Trunk, the Wabash and the Michigan Central. The preamble to the order recites that it is charged that the Canadian Pacific has been, and still is, in open violation of the act to regulate commerce, making unreasonably low rates between various points in the United States.

North Carolina Passenger Fares.

The State Railroad Commissioners of North Carolina have refused to order a reduction of passenger fares on the Southern Railway and have postponed the question of making a reduction on the Seaboard Air Line. On the Wilmington & Weldon, a part of the Atlantic Coast Line, a reduction has been ordered from 3¼ cents to 2½ cents a mile, first class, and from 2½ cents to 2 cents, second class. The refusal of the Commission to order a reduction on the lines of the Southern Railway is looked upon as a decided defeat for the Governor, who had formally demanded a reduction, for the purpose, it is alleged, of punishing the road because he was unable to break its lease of the North Carolina road.